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1. INTRODUCTION

This manual describes the operation of E.E.Tools' **TopMax** software driven device programmer. The information contained in this manual has been reviewed for accuracy, clarity, and completeness.
Please report in writing any errors or suggestions to support@eetools.com

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About This Manual

The TopMax User Guide explains how to install and run the programming software on your computer.

- Chapter 2 describes the most popular programming devices.
- Chapter 3 contains all terms and symbols used in the manual.
- Chapter 4 contains instructions for installing and running the TopMax.
- Chapter 5 describes basic operating examples of the TopMax.
- Chapter 6 is organized by main operating commands and gives detailed instructions on each command including macro files and batch mode operation.
- Chapter 7 provides troubleshooting information for identifying and solving problems with your TopMax. It provides a detailed guide for *E.E. Tools*' technical support and return material procedures.

This Manual assumes that you have a working knowledge of your personal computer and its operating conventions.

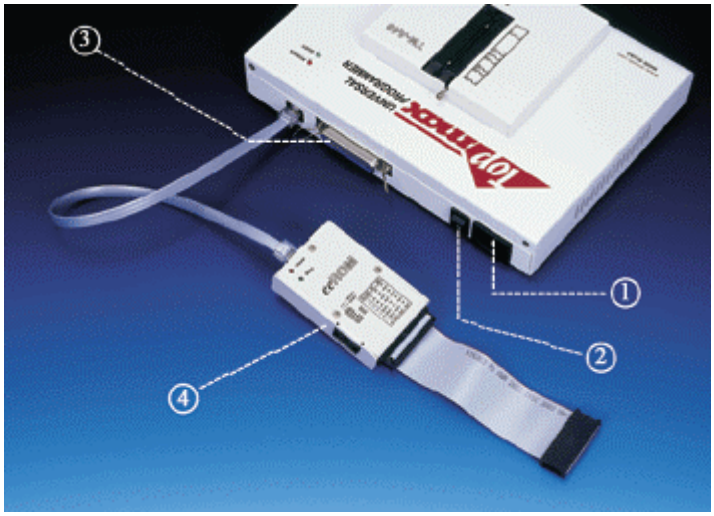
General Description

TopMax is a software driven device programmer that supports a wide variety of programmable devices including: EPROM, EEPROM, Serial PROM, EPLD, PEEL, GAL, FPGA, and single chip Microcontroller.
TopMax easily connects to the parallel printer port of any IBM PC, and can operate with a full spectrum of IBM compatibles: PC XT, AT, 386, 486, Pentium, PS/2, portable(laptop), and clone computers.

The great advantage of TopMax is its programming speed and superior software. **TopMax** is controlled via a host IBM PC computer. The operating software has a user-friendly interface that includes window pull-down menus, macro facility for batch file executions (DOS version), and virtual memory management to deal with very large files (DOS version).

The main capabilities of TopMax with software installed on IBM PC are:

- Selection of a device type and a manufacturer of source or target device,
- Loading and saving data files in Binary, Intel HEX, Motorola S, Tektronix HEX, and JEDEC formats,
- Distribution of 32- and 16- bit data into 8- bit portions,
- Maintenance of file, device, and buffer offset addresses,
- Blank checking, reading, writing, and verification of devices,
- Security fuse blowing for PLD devices,
- Provides parallel test vector application,
- Auto Device Selection of E(E)PROM and Flash memory devices, programming options,
- Hardware self-test for TopMax programmer.



Basic Technical Specification

1. Universal AC power input (90-245 VAC / 47-67Hz)
2. Power ON/OFF switch
3. Parallel port connector
4. EPROM Emulator(Option)

Dimension

- **Module**: 9.75"(L) x 7.50"(W) x 2.25"(H) (Perfect size for briefcase)
- **Material**: Heavy-duty Aluminum
- **Weight**: 3.25 lb.

Interface

- **TopMax** uses a standard parallel port (LPT1, LPT2, LPT3)

Socket

- **TopMax** has a Textool 48 pin ZIF (300/600 mil) standard.

Optional adapter

- **PA44-48U**: supports all 44 pin PLCC devices.
- **PA44SO44D**: supports all 44 pin SOP devices.
- **PA48TS48D**: supports all 48 pin TSOP devices.
- **TM-8G-HD**: Universal 8-gang base with 4 slots to fit 4-HEAD makes 8-gang programmer (Refer to TopMax 8-Gang adapter list in the back page). TopMax User who is going to use the TM-8G-HD for 8-gang programming needs to use the TOPMAX8W software. Unlike TM-8G customers, customers who buy the TM-8G-HD must buy the header; which contains 2 sockets each.
- **TM-8G**: 8-GANG adapter for programming E(E)PROMs up to 32-pins. It contains only 32-pin DIP 8 sockets.

***NOTE**: The TopMax universal pin driver capability lets it program all 48-pin DIP devices without DIP-to-DIP adapters, including all single-chip Microcontroller. The market, however, offers many choices besides DIP devices, such as PLCCs, SOPs, TSOPs, QFPs, and SOICs. We have developed over 50 different converters to support these non-DIP device packages. The TopMax universal pin driver not only eliminates the need of programming modules, but also significantly reduces the number of converters required, reducing your cost for future expansion. A single 44-pin PLCC adapter lets it program all 44 pin PLCC devices. All additional adapters for different package types are available from factory stock. Please contact sales@eetools.com for additional information.*

Option

- **EEU 100 :** World Exclusive ROM Emulator for USB port interface.
  - High speedy USB port interface (Plug & Play).
  - Fast download (8Mbit per second).
  - Supports 8bit, 16bit, and 32bit data Daisy-chained with EEU100(s).
  - High Speed access time (built-in 1M SRAM 15ns).
  - No external power is needed.
  - Full support for Windows 98/Me/NT/2000.
  - Accepts all standard Hex formats and binary files.
  - Disassembling function support 11 CPU types.
  - Safety circuit against inverse insertion.
  - Jumperless Emulation size configuration.

(System Requirements for EEU100)

	Devices Supported (16bit : two EEU100s needed)	**Software Setting** for Target Memory **(Memory Type : EMU Type)**
EPROM DATA : 8BIT	27C64	EPROM (2764)
	27C128	EPROM (27128)
	27C256	EPROM (27256)
	27C512	EPROM (27512)
	27C010	EPROM (27010)
	27C020	EPROM (27020)
	27C040	EPROM (27040)
	27C080	EPROM (27080)
EEPROM DATA : 8BIT	2864	EEPROM (2864)
	28512	EEPROM (28256)
FLASH ROM DATA : 8BIT	29512	FLASH (29512)
	29010	FLASH (29010)
	29020	FLASH (29020)
	29040	FLASH (29040)
EPROM DATA : 16BIT	27C1024	EPROM (27512) – 16BIT
	27C2048	EPROM (27010) – 16BIT
	27C4096	EPROM (27020) – 16BIT
	27C8192	EPROM (27040) – 16BIT
FLASH ROM DATA : 16BIT	291024	FLASH (29512)
	292048	FLASH (29010)
	294096	FLASH (29020)
		EPROM (27080) – 8BIT
		EPROM (27080) – 16BIT

Power Supply

- Safety Standards: UL, CSA, VDE
- EMI Standards: FCC, VDE
- **Input:** From 85VAC @ 47Hz to 264VAC @ 63Hz
  Max 1A @ 115VAC or 0.6A @ 230VAC
- **Output:**

DC	Min. load	Rated load	Load	Voltage accuracy
+5V	0A	1.5A	2.0A	4.95V to 5.05V
+12V	0A	1.2A	2.5A	11.4 V to 12.6V

System Requirement

- **Type:** IBM PC XT, AT, 386, 486, Pentium, PS/2, Portable (notebook) or compatibles.
- **A hard disk drive**: 9Mbyte to install TopMaxw.exe software.
- **RAM size:** 512K
- **Host computer I/O :** Either one of standard parallel ports (LPT, LPT2, or LPT3).
- **Operating System:** PC-DOS or MS-DOS (v 2.1 or greater). Window95/98/NT/2000

TopMax Package Contains

- TopMax Programmer with a 48 pin ZIF (TM-48) socket and a built-in universal (115 - 230 VAC) switching power supply.
- 6 feet long parallel printer cable.
- 6 feet long AC power cord (USA only).
- Set up diskettes (2) and manual for Windows version.
- Registration and warranty card.

***NOTE**: Be sure to complete and return the enclosed registration and warranty card so that we can continue to provide you with updated software, technical support, and new programmer developments.*

2. FAMILIES OF DEVICES

The devices that are supported on the *E.E. Tools*' programmers are:

EPROM

Ultraviolet erasable ROM's and use cell-based technology where each bit has a cell which is either charged or not charged to determine a logic one or a logic zero.

The structure of an individual EPROM memory cell is that of a dual gate metaloxide semiconductor (MOS). Stacked above the source and drain structure are two insulated gates. The upper gate is connected to the address multiplexer. The lower gate is left floating (electrically insulated from the surrounding components). If the cell has been erased (e.g. as shipped from the IC vendor), application of a logic high (+5V with respect to the source) to the upper gate will cause the current flow from the drain to source. A cell is programmed by applying a programming voltage (+12.5V to +25V depending upon the particular device) to the upper gate. This causes electrons to jump the insulating barrier and collect on the lower gate. When the programming voltage is removed, the device geometry is such that electrons remain on the lower gate. The electric field generated on the upper gate of a programmed cell is blocked by the electrons present on the lower gate, preventing the current from flowing from the source to the drain.

EEPROM

Are devices which are electrically erasable and usually programmable at five volts. They typically have a part number starting with 28XXX.
EEPROMS, usually referred to as E-squareds, are Electrically-Erasable Programmable Read-Only Memory devices. EEPROMS program byte-by-byte (as opposed to FLASH memory which must be erased before programming). No erasure is needed before programming any location. The EEPROM automatically erases each location before it is programmed. EEPROMS have a slow programming time, are less dense than EPROMS or FLASH, and are usually used in situations requiring small amounts of memory due to their high cost. Although EEPROMS have slow programming times, some EEPROMS allow programming and erasure to take place in N-byte pages (where n=16,32, 64, etc…), making programming and erasure much faster.
For a comparison of EEPROMS with EPROMS and FLASH, see the selection under FLASH MEMORY.

FLASH MEMORY

These devices are also electrically erasable, but you must place the chip into erase mode and then erase parts of it. They require special algorithms to access the internal registers to erase or program. They typically have part numbers that start with 28FXXX or 29FXX. FLASH memory devices are unlike normal EPROMS in that they may be erased electrically. This means that it is no longer necessary to place the device into an eraser, but to simply erase it while it is in the ZIF socket. Since FLASH memory may be reprogrammed and is far less expensive than EEPROMS, FLASH memory is a good choice for in-circuit designs. One-time programmable (OTP) EPROMs are inexpensive because there is no window on the device. Because they can only be written into once it makes software updates either impossible or very expensive. EPROMs may be re-programmed, but only after they are taken out of the circuit and erased, which means that they cannot be soldered directly into the circuit, making production costs higher. Also, EPROMs are more expensive due to the expense of the quartz window on the device. In some cases, such as a 32-pin (or smaller) PLCC, the device is too small to permit a window.
EEPROMs allow re-programmability, and thus may be directly soldered into the circuit. However, EEPROMs are considerably more expensive than OTP EPROMs, EPROMs, and even FLASH devices. EEPROMS are also less dense than EPROMs and FLASH.
FLASH memory, however, is relatively inexpensive as compared to EEPROMS, and may be re-programmed. This allows the device to be soldered directly into the circuit, avoiding the cost of having to remove the device.
FLASH devices may not be re-programmed byte-by-byte like EEPROMs, but when used for sequential storage or updates, it usually doesn't matter.
FLASH memory may be reprogrammed in 3 different ways: by erasing and reprogramming the entire device, erasing and reprogramming an entire block, or a smaller block of the device. INTEL and TOSHIBA flash memory usually

need to be erased and reprogrammed entirely and requires 12 volts to program/erase.
SEEQ flash memory allows 512-byte blocks to be erased and reprogrammed independently of the rest of the device. SEEQ flash memory also require 12 volts to program or erase.
ATMEL flash memory allows 64-byte blocks of data to be erased and reprogrammed independent of the rest of the device. ATMEL flash devices program/erase with 5 volts. Also, ATMEL devices do not require special programming and erasing algorithms.
To erase a FLASH device with the TopMax software, the option Erase must appear in the Device menu. If this is the case, press E to erase the device. With FLASH devices, the entire device is erased. *Before erasing, remember that the entire device will be erased.*

Non-Volatile (NV) RAM and SRAM

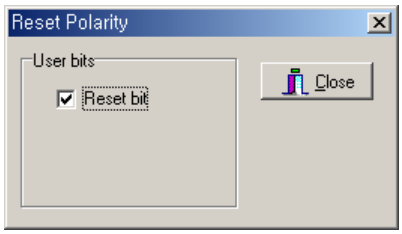
Are devices which are typically battery backed RAM and require 5 volts to program. They do not require erasure to program, and retain their memory after the power is turned off.

Serial EEPROM

These devices are electrically erasable, but they operate in a series rather than in parallel.

- **Xilinx 17xx family**
  From the Xilinx 17xx series, the RESET Polarity can be changed only on Xilinx 17xxD/L and 17128. On devices with EPROM portion already programmed or on new blank devices, RESET polarity is HIGH. The current status of the Reset pin polarity is determined and displayed on the screen after Reading the device. The polarity of the Reset pin can ONLY be changed from HIGH to LOW, but not vice versa. To change the polarity, click on the Option button and check on the Reset bit box before programming your device. To ma

  ke certain that the RESET Polarity has been changed, read the device again. On other serial EEPROM devices (but NOT Xilinx 17xxD/L & 17128) the RESET polarity is always HIGH and it cannot be changed to LOW.



Non-Typical Devices

8-bit 1-Megabits

There are four types of 1 Megabits EPROMS. One set has the A16 and OE lines swapped. However, these devices will still program and verify like normal 1 Megabits. Once these devices are placed into the circuit, it will appear as if they have not been programmed correctly. This is not due to the TopMax software or the TopMax, but the difference between these 1 Megabits. When selecting a 1 Megabit, it is important to determine which one you have. Here is a list of 1 Megabits and their equivalents:
27010 (normal pin-out -- program as GENERIC or INTEL 27010):
Equivalents: INTEL 27010, HITACHI 27101, TOSHIBA 571000, NEC 271001, MITSUBISHI 27101
27301 (non-standard pin-out -- program as HITACHI 27301's):
Equivalents: HITACHI 27301, NEC 271000, MITSUBISHI 27100, TOSHIBA 571001, INTEL 27C100

16-bit 1-Megabits

Any devices with the number 27210, 271024 and the MITSUBISHI 27102. 27011: The 27011 is a 28-pin 1-megabit device that is organized into 8 pages of 16k-bytes. ***NOTE***: The 27513 is 4 pages of 16k-bytes.

Erasing an EPROM

An EPROM has a quartz window located on the chip just above the die. Erasing an EPROM is done by exposing the EPROM to high-frequency ultra-violet light waves. Erasing an EPROM usually takes from 15-20 minutes, but may be shorter or longer, depending on the device. Many manufacturers make EPROM erasers. If you wish to purchase an eraser, call E. E. TOOLS at 408-734-8184. When an EPROM is not being erased, the window may be covered with an opaque label. Sometimes (over a period of years) an EPROM will start to erase due to the rooms level of fluorescent light. Direct exposure to sunlight also has this effect, but happens much more rapidly.

PLD

A programmable logic device (PLD) consists of an array of logic gates and flip-flops that can be programmed to implement an almost unlimited number of logic designs. These are programmable logic arrays which can be EEPROM based, EPROM based, fused link, anti-fuse, or Flash-based technology. They are programmable by the user to implement logic circuits in order to reduce part count and turnaround time. PLDs are programmed according to a fuse map, which is typically contained in a JEDEC file.

PLD Features

Many different PLDs are available from the IC manufacturers. PLDs are fabricated using either bipolar or CMOS Processes. All PLDs are made up of combinations of AND gates, OR gates, inverters, and flip-flops.

- **PAL**: The PAL is a PLD with a fuse-programmable AND array. The PAL's AND gates connect to OR gates in a fixed pattern.
- **PROM**: For many years, the PROM was not classified as a PLD, even though most of the smaller PROMs (32 x 8 organization, for example) were being used as logic elements. The larger PROMs were still applied in bipolar microprocessor designs to store microcode instructions. The PROM has an architecture similar to the PAL, except that the PROM's AND array is fixed while its OR array is programmable.
- **FPLA**: The field-programmable logic array (FPLA) consists of a programmable AND array like the PAL, with a programmable OR array like the PROM. The FPLA is therefore a more general PLD because any product term may be connected to any output OR gate. Because the entire IC is programmable, the FPLA can implement some functions which a PAL or PROM may not be able to implement.
- **EPLD**: Several manufacturers produce PLDs which can be erased and reprogrammed like EPROMs. These ICs are called erasable programmable logic devices, or EPLDs. Internally, they have the same programmable AND-OR-register structures of the PAL and FPLA.

Microcontroller

These devices are CPU's with on-chip EPROM and RAM. They are typically 40 pins and are UV erasable. They have part numbers such as Intel's 8748,8749,8751,8752 etc. A micro-controller is generally a computer-on-a-chip with RAM, ROM, and I/O ports. Microcontrollers are usually used for specific purposes, such as keyboard decoders, printers, clocks, telephones, CD-players, or any other application that requires a small, on-board computer. Microcontrollers are used to take the place of in-circuit logic, as it can be less expensive and take less space. Also, since it is software driven, the device may be updated very easily. Micro-controllers have the ability to use internal as well as external RAM. Also, micro-controller data may be encrypted or otherwise secured to prevent copying of the data or program information. Micro-controllers also have their own instruction set, usually very similar to familiar microprocessors (such as the 8080 or 8086). The INTEL MCS-51 family features up to 64k each of internal and external memory, 32 I/O lines, interrupts, timers, and bit-addressable RAM. It's instruction set contains 111 instructions. However, for specific purposes, limited versions of the 51 family are available. For instance, the Signetics 87c751/87c752 families do not allow external RAM to be used, and have limited I/O channels, etc. However, these devices still allow for data/program encryption and security levels. They are also less expensive than the MCS-51 micro-controllers.

See the help selection under MAIN-MENU COMMANDS for Encryption and Security-bit information.

***NOTE**: Programming Microchip PIC family*
Microchip PIC series are different from other microcontrollers in that they have an EPROM area as well as a Configuration Fuse. The Configuration Fuse in the PIC family is used to setup different Oscillator types, to set Memory Code Protection and Watchdog timer, and etc. To program this fuse:

1. *Program the EPROM portion of the device*
2. *Click on* **Option**
3. *Make any changes if necessary*
4. *Click on the* **Program Configuration Fuses** *button to program the fuse information that you want to program*
5. *Click on the* **Read Current Configuration Fuses** *button to read back the current status of the fuse*
6. *Press the* **Close** *button*

***NOTE**: In order to obtain more information about programming the configuration fuse, please contact Microchip technology at 602-786-7200 or refer to their data book.*

3. TERMS AND SYMBOLS USED IN THE GUIDE

Safety Note Conventions

- ***NOTE** assists the user in performing a task. It makes the job more easily understood.*
- ***CAUTION** alerts the user that unexpected results or damages to a device may occur if an instruction is not followed.*

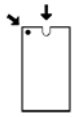
Other terms and definitions are as follows

- **Toolbar**: Clicking on a toolbar button manipulates operations or commands for TopMax programmer software.
- Bold/Italics – actions items/software functions, i.e. Edit Button, IC Test, or Change Algorithm.
- Device : The IC you are attempting to read, program, or verify.
- Buffer : The work area in your computer memory to execute Read, Save, Program, and Verify. The Buffer size may be from 64K to 32 Megabytes.

***NOTE**: If the size of a device is bigger than the buffer size in your computer, TopMax will use the hard disk space (swapping). For this reason, the TopMax software can handle devices up to unlimited size of E(E)PROMs with your standard memory space (a minimum of 512KB RAM memory is required).*

- **Inserting a DIP Device**

Pin 1 on a DIP package is generally indicated by a notch on one end of the device. Pin 1 is also indicated by a stamped or recessed dot on one corner of the device. In the illustration below, the notch and the dot are highlighted by arrows. The dot is on the left and the notch is on the right.



- To Insert a DIP device into the ZIF socket:

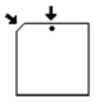
***CAUTION**: Devices are static sensitive. Operate your programmer at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 mega-ohm (minimum) to 10 mega-ohm (maximum) isolating resistor.*

1. Lift the socket lever to the open position.
2. With the notched end facing the top of the socket, place the device in the socket so that the bottom of the device is aligned with the bottom of the socket (bottom justified).
3. Lower the socket lever to lock the device into the socket.
4. When you are done, select the device you just inserted.

- **Inserting a PLCC Device**

***NOTE**: In order to use **PLCC** devices, your programmer must have a proper adapter for the device. Consult your programmer's adapter list for the non-standard device.*

Pin 1 on a **PLCC** package is generally indicated by a notch on one corner of the device. Pin 1 is also indicated by a stamped or recessed dot on one side of the device. In the illustration below, the notched corner and the dot are highlighted by arrows. The notch is on the left and the dot is on the right.

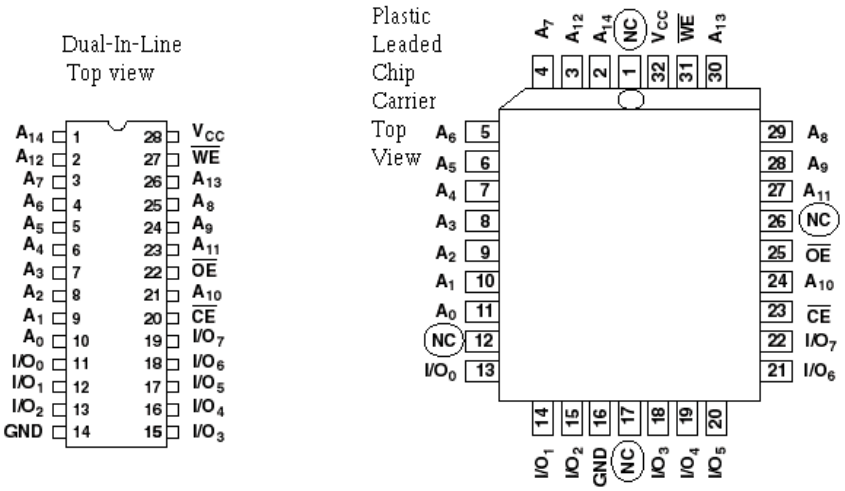


- To Insert a **PLCC** device into an adapter:

  ***CAUTION**: Devices are static sensitive. Operate your programmer at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 mega-ohm (minimum) to 10 mega-ohm (maximum) isolating resistors.*

1. Open the adapter 90 degrees, set its front edge under the two tabs at the front of the base opening, and lower its back edge into place.
2. Orient the device you want to use so that pin 1 is next to the retaining latch. Each Adapter has a small molded dot that represents pin 1 and a notched corner that can be used to align chamfered corners of devices.
3. Insert the device into the open adapter.
4. Close the Adapter, and press the retaining latch forward with your thumb until the latch snaps into place.
5. If you have not already, select the device you just inserted

Pin Connection Diagram Example between DIP and PLCC package



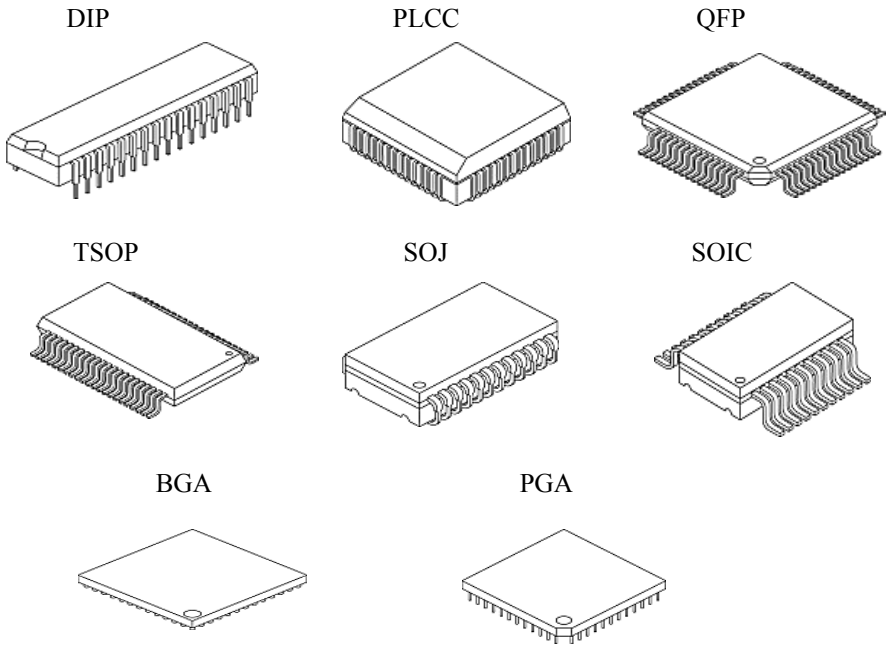
Choosing The Right Adapter

Most programming adapters are simple package converters. They allow QFP, SOIC, or PLCC devices to plug into the same device's DIP footprint. These adapters are available for memory, logic and microcontrollers. They can often be used with many devices from various manufacturers. For devices that cannot use a generic footprint we have offered adapters to work with specific programmers.

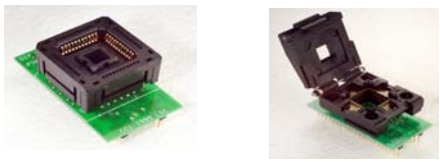
Here is what you need to know to select the appropriate adapter.

1) The part number and manufacturer of your device.
2) Your device package. (PLCC, DIP, QFP, SOIC, etc.)
   (Refer to the following package drawings)
3) Your device pin count.
4) In some cases you will need your device package dimensions for SOIC, SSOP, and TSOP chips.

Different Device Packages

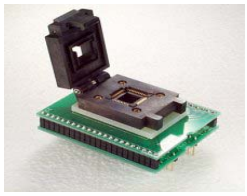


Different Programming Adapters



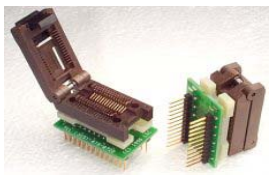
PLCC-TO-DIP

TSOP-TO-DIP

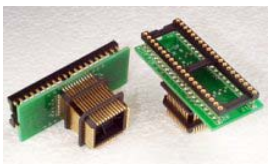


QFP-TO-DIP

SOIC-TO-PLCC



DIP-TO-PLCC



(for Emulator)

4. GETTING STARTED / INSTALLATION

Installation Requirements

TopMax is designed to operate with any IBM-PC, XT, AT, 386, 486, Pentium, PS/2, Portable (notebook), compatibles running PC-DOS, MS-DOS 2.1 or greater, WIN NT, WIN2000. The computer requires a double-sided disk drive (1.44MB), but a hard disk drive is also recommended

Hardware Installation

The following section details the procedure for accomplishing the hardware installation procedure. TopMax easily connects to any parallel printer port in your computer. There are three different addresses for the parallel port. When you select an address from LPT1, LPT2, LPT3, one of them should be valid without a communication error message. Turn the AC switch ON before running the TopMax software. Make sure that you connect the printer (IEEE) cable

between TopMax and your available printer port and lock the shields in each side of the cable. Be sure that TopMax recognizes your computer's parallel port address when you execute the TopMax icon

To install the software from the Internet download option

- Go to www.eetools.com and select software ***TOPMAXW.EXE*** from the download section when you are ready to download.
- When prompted, choose the drive and directory where the self-extracting TOPMAX.EXE file is to be saved in.
- Once the download is complete, double-click on the file name to install the software.

To Install the software from a diskette drive

- Place the diskette labeled ½ in the diskette drive.
- Choose SETUP.EXE from the list of files located on the diskette. The SETUP program will launch the installation procedure and it will ask you to insert the second diskette. Follow the same procedures as for the first.

To Start the windows software

- To run the windows software, select the TopMaxw shortcut in the Windows Start Menu/Programs list.

Trouble Shooting In Installation

A communication error may occur on the screen if the hardware / software is not correctly installed.

Be Sure That The Following Steps Are Checked:

- Make sure that the **TopMax** is connected to your PC printer port directly. It will not work with multiple port connectors.
- Be sure your printer cable is firmly connected to your computer and **TopMax** programmer.
- Plug in the AC power cord to your **TopMax** and turn the switch in the back of the TopMax on.

> ***NOTE**: The TOPMAXW detects the printer port address when you install the new software. When you see "Cannot find the TopMax programming module", go to CONFIG/PORT and select all three parallel port addresses. If you see the same error message continuously, you should contact technical support.*

5. QUICK START EXAMPLES

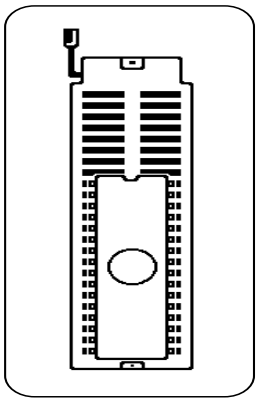
If you are using the TopMax for the first time, this section will help you to become familiar with the basic operating procedure. This section includes two examples of device programming with your TopMax.

Programming an EPROM

We selected an AMD 27C010 EPROM to show you how to program an EPROM. The 27C010 EPROM needs to be erased (blank) before this procedure begins.

> ***NOTE**: EPROMs have a quartz window that can be erased by exposing the EPROMs to ULTRAVIOLET(UV) light. Erasing an EPROM usually takes 10-30 minutes.*

1. Click on the TopMaxw shortcut :
2. Check the optional configuration before programming begins.
3. Click on the **Select** button. There are two different ways to select the target device from the menu: by choosing the device manufacturer and type using the arrow keys or you may type the manufacturer and the device names on NAME box. TopMax will display the names of devices that have the best match to your input. After selecting the device, the detailed device information box is provided below the select menu screen.
4. Click on the **Load** to load a file from a floppy or hard disk into the buffer. Change your file directory by choosing a directory in LOOK IN box. Make sure that the file type is selected; "All Hex File" or "Binary file" is located in the File of type box.
5. Select the ***Device*** in order to begin programming.
6. Insert the 27C010 device into the ZIF socket. After inserting the part, make sure that the socket handle is down (close) to secure the chip. See the illustration below:



7. Click on the highlighted cursor ***Blank Check***.

   NOTE*: If an EPROM is not erased completely, it will not pass the Blank Check. If an EPROM is damaged to begin with, it may not pass the blank check, although it has been erased for a long time.*

8. Click on the ***Program***.

   CAUTION*: Do not touch the device while the BUSY GREEN LED light is on (programming is in progress).*

After programming a device, the part is automatically verified. The CheckSum is calculated and displayed in the OPTION info. In order to verify your work, read the programmed part again. If this CheckSum value matches to that of the Programming CheckSum, then the 27C010 is programmed successfully.

Duplicating an EPROM

The following is an instruction on duplicating a programmed device. In order to do so a source device and an **erased (blank)** target device are necessary.

Source Device: Programmed AMD 27C256
Target Device: Erased or blank INTEL 27C256

1. Make sure the **TopMax** main menu is displayed without any communication error (refer to programming section).
2. Place the AMD 27C256 device into the ZIF socket.
3. Select the manufacturer and part names from the **Select** menu.
4. Click on the **Read** button. In order to make sure the device is read properly, Click on the **Verify** button.
5. Remove the current chip from the socket and replace it with the erased or blank INTEL 27C256 device. Select the appropriate device from **Select** menu on screen.

   NOTE: You do not need to change the device information if you use the exact same chip as the source device.

6. Click on the **Blank** button.
7. Click on the **Program** button. The part will be programmed and verified automatically. If no error messages appear during the Programming or Verification process, your duplicating work is done successfully. You have a duplicated INTEL 27C256 part from AMD 27C256 chip.

6. OPERATIONS

This section describes the operation of the software. The Main standard system-menu is divided into four display areas: Main operation menu screen, Option Information, System information, and counter.

Basic Menu Screen Information

Option Information

- **Gang Size** : Current socket size when TopMax is used
- **Split** : Current world format for split programming
- **Enc Mode** : Enable or Disable Encryption mode for Microcontrollers
- **Base Port** : Current parallel port address
- **Check-Sum** : Check-Sum number of the data in current buffer
- **H/W Rev** : Hardware revision number for your programmer
- **S/W Rev** : Current **TopMax** software revision number
- **Serial No** : Serial number of **TopMax** hardware

Additional Option Information For Non PLD Devices

The following information presents programming information of the selected device.

- **Algorithm** : Programming Algorithm
- **Vccp** : Main Power Supply Voltage
- **Vpp** : Programming Power Supply Voltage
- **Tpwp** : Programming Pulse Width

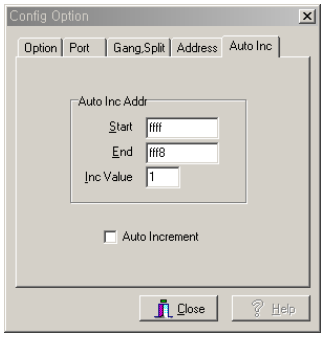
System Information

- **Device Name** : The current device number with manufacturer name
- **Device Size** : The size of device in HEX value (Ending Address – Starting Address + 1)
- **Free Disk** : Check the free disk space for a big size E(E)PROM programming.
- **Adapter** : Optional Adapter Name for Non-standard devices
- **Pins** : Number of device pin
- **File** : Current working directory path and file name after loading a file

Counter

- **Devices/HR** : Displays the estimated number of devices that can be programmed per hour. This feature can only be used when choosing the *Program* or *Auto* selection under the Device button.
- **Success** : The number indicates the devices programmed successfully.
- **Failure** : This number indicates the number of device programming errors that occur during a programming cycle. These could be either ***Blank Checking***, ***Programming***, or ***Verification*** *error*.
- **Count** : The number indicates all devices executed successfully and unsuccessfully.

NOTE*: This feature is useful for repeat programming on the same device. You can make an estimate time to perform the programming job and see the successful and failed devices after finishing the Program or Auto Repeat programming routine.*



***NOTE**: The feature allows users to program a certain area that might contain a serial number in the memory device with serialized number by a certain value.*

***Start** : Start address of memory that contains serialized data*

***End** : End address of memory*

***Inc Value** : This value will be added to the previous data value*

User must click on Auto Increment to program a memory with data increased by one to the previous data.

File

TopMax uses three different file types: BINARY, ALL HEX, and .POF.
In the file types box, a file type can be selected and loaded to the buffer or saved onto a disk. The default file type is the Binary file. The All HEX files can be chosen by maneuvering the arrow button. All HEX files include INTEL HEX (MCS-80/86/386, MOTOROLA S (1-9), Tektronix HEX and ASCII HEX.
OPF (Programmer Object File) is a binary file generated by Altera assembler (Quartus and MAX+PLUS II). This file should be loaded for Altera MAX or EPC family devices only.

- Binary Format

Binary format does not specify the address or checksum of the file. The file contains the actual binary data. An example of this format is a DOS executable file with an .EXE or .COM extension. Binary format is generated for programmable memory devices. It is recommended to save your EPROM data as binary format in order to load the file as a standard file format later.

- Intel HEX Format

Intel HEX format files are text files that include the file information in hexadecimal.

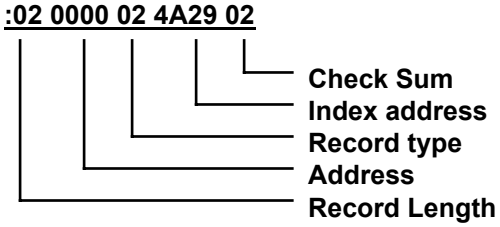
1	:	A record mark
2 – 3	Byte	Record length in 2 digit HEX, Max 20 (64 in ASCII)
4 – 7	Address	4 digit HEX Field. Most significant byte first
8 – 9	Byte	2 digit field record type : 01 End of file 02 Extended address
10 – N	Data	Data field in HEX digits
N+1 – N+2	Check-Sum	Two digit HEX Check-Sum character computed by two's complementing the sum of previous bytes except the ':'

INTEL HEX FILE EXAMPLE

:1100000004441544 14D414E2053332053455249414C73

:00000001FF

The extended address record specifies the index address where data will be loaded into. The Extended Address will continue to offset data record address until a new Extended Address record is specified.



- The Address field is blank because this record is not data.
- The record length is '02' for index address (2 Bytes).

NOTE: If the address for the data record is '2B56', the actual address will be 4A290 + 2B56 or 4CDE6(HEX).

■ Motorola S HEX Format

The Motorola S format file is an ASCII-HEX file.

Position (Byte)	Character	Remarks
1	S	Letter S indicates start of record
2	0, 1, 2, 3, or 9	A single character indicates the type of record. **9**: End-of-file **3**: 32-bit address data record **2**: 24-bit address data record **1**: 16-bit address data record

	0: Header	
3 - 4	Byte	Byte COUNT in HEX (multiply by two for number of characters). This count includes the address, data, and CheckSum field.
5 - X	Bytes	Memory Address for the current record.
	X will be:	
	8 : 16-bit addressing for files less than 64K.	
	10: 24-bit addressing for files greater than 64K.	
	12: 32-bit addressing for files greater than 64K in length.	
X+1 - N	Bytes	HEX Data (two per byte)
N+1 – N+2	Check-Sum	Two digit HEX Check-Sum character calculated by one's complement of DATA, ADDRESS and COUNT.

Motorola File Example

S1140000444154414D414E2053332053455249414C6F

S9030000FC

■ TEKTRONIX HEX Format

The Tektronix HEX format contains ASCII records, expressing bytes ASCII pairs.

Position	Character	Remarks
1	/	Slash character for start of line
2 - 5	2Bytes	Address. MSB first load
6 - 7	Byte	Number of data bytes (not checksums)
8 - 9	Byte	Check-Sum of ADDRESS and COUNT by character in HEX (not by byte)
10 - N	Data	Data bytes as ASCII pairs
N+1 - N+2	Byte	Check-Sum of Data by character (not as bytes)

Tek Hex Example

/0000110244415441 4D414E2053332053455249414C8F

/01000001

■ ASCII HEX format

This selection generates an ASCII coded HEX format for either 4-bit or 8-bit PROMs. Each record contains a four-digit HEX address (16-bit) followed by 16 data elements. A 16-bit checksum is at the end of the file.

When this format is selected, the device base address must be specified. This address represents the lowest address in the device. The file created contains an entry for each location in this device. ASCII HEX format can be created for programmable memory devices only.

■ JEDEC Standard <PLD devices only>

JEDEC (Joint Electronic Device Engineering Council) files are the standard method for describing PLD fuse patterns and test vectors. JEDEC files contain fuse data, test vectors, part numbers, and checksums. The checksum of the file allows you to verify that a given file is intact and has not been unintentionally modified. JEDEC files normally use the extension (last 3 letters) ".JED."
For more information on the JEDEC standard, contact:
Global Engineering Documents Inc. at (800) 854-7179
Electronic Industries Association at (202) 457-4900.

Following is an example of a JEDEC file:

```
<STX>File for PLD 15S8 Created on 11-SEP-96 5:08PM
2754 memory decode 345-432-123
Seung Park PK Logic corp.
QP20* QF448* QV8*
F0*X0*
L000011111011111111111111111111*
L002810111111111111111111111111*
L005611101111111111111111111111*
L011201011011011110111111111111*
L022401111011101110111111111111*
L033601010111011101111111111111*
V0001000000XXXNXXXHHHLXXN*
V0002010000XXXNXXXHHHLXXN*
V0003100000XXXNXXXHHHLXXN*
V0004110000XXXNXXXHHHLXXN*
V0005111000XXXNXXXHLHHXXN*
V0006111010XXXNXXXHLHHXXN*
V0007111100XXXNXXXHHLHXXN*
V0008111110XXXNXXXLHHLXXN*
C124E*<ETX>8646
```

STX The fuse map begins with an ASCII STX character (02 HEX)

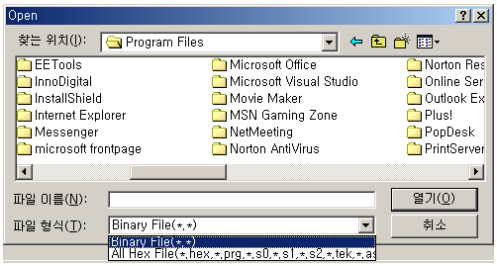
Design Specification This item is user specified. While no format rules apply, certain information, such as user's name, company, design date, part designation, revision and device part number, should be entered. This field is illustrated by an asterisk (*).

QP Specifies the number of pins in the devices.

QF Specifies the number of JEDEC fuses in the devices.

L The fuse list fields contain the state of all fuse links in the devices. The starting fuse number follows the L specifying the field type. The fuse list that follows contains a zero (0) for each intact link and a one (1) for each blown link. An L field is generated for each product term in the device.

C The checksum field contains the 16-bit sum of the link stated in the 8-bit words.



ETX The fuse map ends with an ASCII ETX character (03 HEX).
Sum Check A 16-bit sum of the ASCII values of the characters from STX to ETX inclusive. The sum check follows the ETX.

***NOTE**: LOGIC Compilers For PLD Devices: Software is available to help the engineer develop designs using PLDs. Software tools called logic assemblers or compilers translate a design file written in high-level language into a fuse pattern stored in a JEDEC file. JEDEC files are produced by almost all PLD development software's and are accepted by the TopMax programmer. There are many commercial software packages available to help you design using PLDs.*

File / Load

Data can be loaded into the memory from a device or by opening a data file. Load fills your buffer memory with the data from storage for viewing or editing. This command loads the data from the selected file storage into the memory buffer. In order to the use "All HEX File" selection, the HEX file must be one of the file formats supported by the TopMax, such as Intel HEX(MCS-80/86/386,

MOTOROLA S(1-9), Tektronix HEX and ASCII HEX.
The default selection on File Load menu is in Binary Format. To select any of the HEX files mentioned above, choose "All HEX File" by pressing ⇓ button. When you have selected the desired file, press the OPEN button to load the file into the data buffer. If you are programming a PLD, you will want to load a JEDEC file. The procedure is identical to loading a data file, except that the files in the current directory will have the JED extension. If your selected device is an Altera MAX family, the file you should load is a POF extension. The TopMax uses a RAM buffer to hold data. After loading a file into the buffer, you can edit the buffer data. If you load a JEDEC file, you may use (the vector pattern edit) command to view or edit the fuse map and (test/vectors) for any test vectors that may have been in the JEDEC file.

File / Save

Save the current data in your memory buffer to a disk storage by using one of the current supported file formats.
Before saving a file, check the buffer and the file address ranges. The contents of the buffer through the specified range will be written into the new file, completely erasing any existing file with the same name. Before saving to a disk, make sure that no file with the same name exists.

Load Project

A project file that saved by SAVE PROJECT menu is loaded. The project files use the extension (last 3 letters) ".prj."

Save Project

This feature allows you to create a job description such as "engineer name" and other useful information for records.
It is very useful for future use when you set up all possible environments such as selecting a device, loading a file, and setting other configurations for programming jobs. A job description can be saved as a file name and the same project environment will be ready once you load the same project name.
File Name: A file name can be entered with the 3 letter extension ".prj."
Author: An engineer's name [whom creates this project].
Description: A job explanation that you memorize for your future usage. A device number, File name, and checksum number can be entered in the note pad. Other programming menu descriptions, such as configurations can be described.

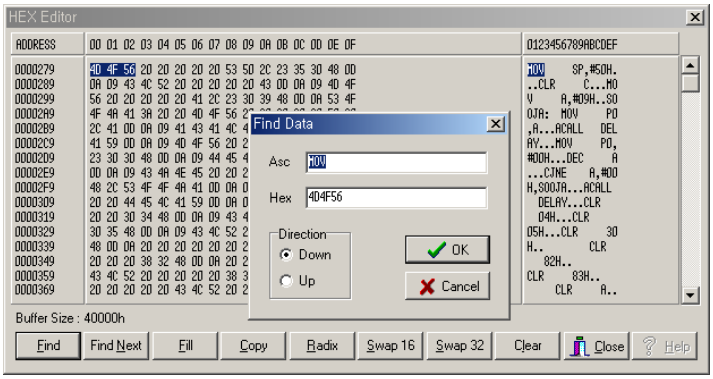
Buffer

Buffer / Edit Buffer

This command allows the user to examine and modify the contents of the memory buffer. This section applies to a non-JEDEC file (PROM, EPROM, EEPROM, and Microcontroller) or to a memory chip. If a PLD is being loaded, see the (vector pattern edit) section. The data is presented in HEX and ASCII formats.

Find

This feature allows you to search the data (ASCII and HEX) in the current buffer.



Asc: The data looking for ASCII value.
HEX: The data looking for HEX value.
Direction UP: The data searching from previous address than the current location.
Direction DOWN: The data searching from higher address than the current location.
If you would like to find more data, click on the **Find Next** button.

Find Next

Press the **Find Next** button to locate the rest of the data that you entered in the **FIND** box. The error "Search Pattern not Found" will be accursed when you press this button without entering data in the **FIND** text box.

Fill

Buffer Start: Starting address for the data to be filled in buffer.
Buffer End: Ending address for the data to be filled in buffer.
Fill Data: Two digits of HEX value to be filled between Start and End buffer.

Copy

Buffer Start: Starting address for data to be copied.
Buffer End: Ending address for data to be copied.
Destination: Start address for data to be pasted.

Radix: Pressing this button will display the address value in decimals (using 0-9) or HEX (using 0-9,A-F). The information appears on ADDRESS column at the left of the buffer screen.

Swap16 This option applies to the current buffer data. Pressing this button allows you to swap 8bit data from ODD address to EVEN address.

Swap32 Pressing this button allows you to swap 16bit data from ODD address to EVEN address.

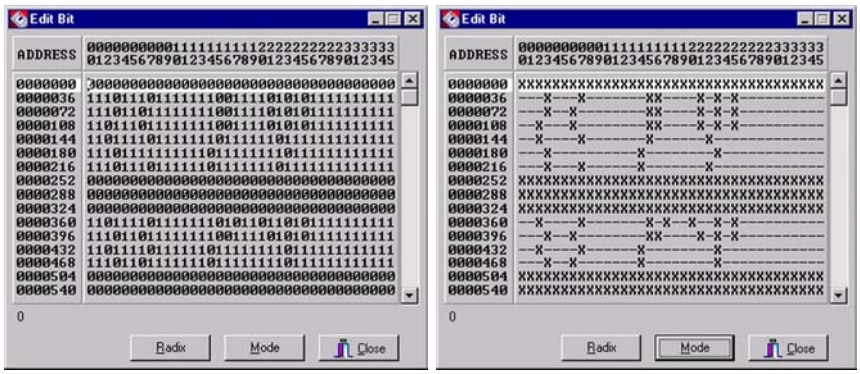
Clear Pressing this button allows you to fill the buffer with the data located in "Default Buffer Value" in Config Option Menu.

Close Press to exit the HEX Editor.

Buffer / Edit UES

The UES Edit command creates or changes the User's Electronic Signature (UES) array in GAL device. Each GAL device contains an electronic signature word consisting of 64 bits of reprogrammable memory. The electronic signature word can be programmed to contain any identification information desired by the user. Some uses include pattern identification labels, version numbers, dates, inventory control information, etc. These features give the user the ability to view and edit the UES data before programming a GAL device.

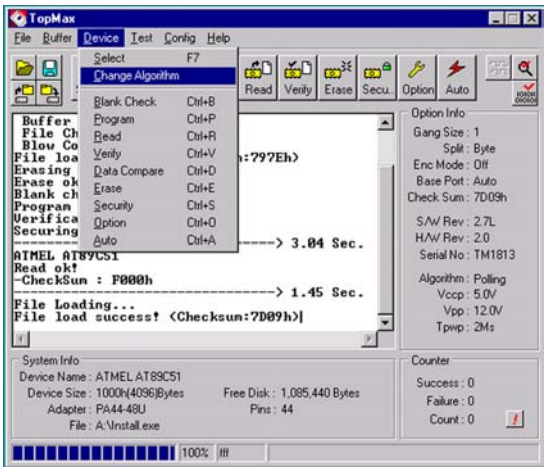
When the UES edit command is invoked, an editing data window appears. If the data fields are empty, you may create a new UES. You can enter the UES up to eight characters in the HEX or ASCII data area. If you see any data from the current UES window, it means the UES has been created and that you can modify the data for a different reason. The UES data is not secured when you execute the Function / Security command.



Device

This section presents the main operation menu for the target device that is mounted on the ZIF socket. In order to process the following commands, make sure that the device is correctly inserted into the ZIF socket and the latch is down.

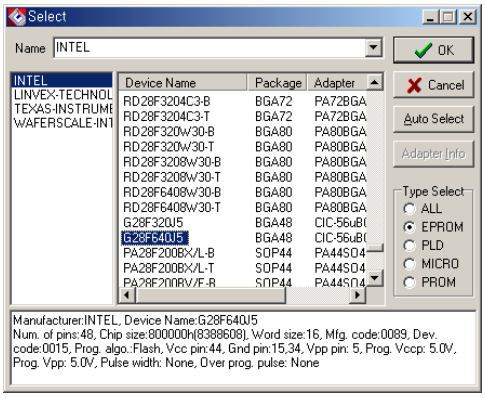
> ***NOTE**: The Device Information display area presents the device information of the selected device.*



Select

During operation, the first step is usually to select a device. This Select command enables the user to define the manufacturer and the type of the device that will be used. After you select a device, you can insert a device into the programmer's device socket and conduct various device operations such as programming and verifying device data or reading data from the device. The Select command contains both manual and automatic methods for selecting a device. If your device is not identified by the Auto Device Select menu, you can select the device list displayed in the Manufacturer & Device list. Scroll through the manufacturers and device numbers until you find the manufacturer and device you are looking for. You can use wildcards to help you "zoom" on the device you are looking for.

***NOTE**: PAL Device Logic Symbols: The logic symbols for each of the individual PAL device gives a concise functional description of the PAL device logic function. This symbol makes a convenient reference when selecting the PAL device that best fits a specific application*



- Select / E(E)PROM, FLASH

All EPROMs (27xxx), EEPROMs (28Cxxx, 29Cxxx), Serial E(E)PROMs (17xxx, 24xxx, 32xxx, 33xxx, 35xxx, 59xxx), and Flash EPROM (28Fxxx, 29Fxxx, 29LVxxx, 29BVxxx, 29Wxxx, 49Fxxx) of 24/28/32/40/42 and up to 48 pins (1 Mbit, 2Mbit, 4Mbit, 8Mbit,16Mbit, 32Mbit, and up).

- Select / PLD

EPLD, EEPLD, FPL, PEEL, GAL, MAX, MACH, PLS, PLD, PLC, PLUS, EPM, ATFxxx, ATVxxxx, EPxxx, EPCxxx, 5Cxxx, 85Cxxx.

- Select / Microcontroller

Intel 87xx, Phillips 87C75x, SGS-Thomson ST62xx, Atmel AT89Cxx, 89Sxx, 89LVxx, Microchip PIC12/16/17, Motorola MC60705xx, MC68HC711xx/705xx; Zilog Z86Exx; NEC 8749H.

- Select / PROM

AMD 27Sxx, Cypress CY7Cxxx, Fujitsu MB71xx, Fairchild 63Sxx, NS 74Sxxx, Phillips 82Sxxx, WSI 57Cxx.

Select / Auto Select

Auto Device Select
Warning :
Auto Device Select is an optional feature.
This option is useful for only 32-pin or less than 32-pin EPROM and Flash Memory.
Other types(GAL,EPLD,EEPROM,Microcontroller) of devices are not able to be recognized by this option and the devices may be defective when you use this feature in the programmer.
If you know the manufacturer and part number, select your part number manually.
OK
Cancel

Identify the device that is mounted on the ZIF socket. This feature can only be applied to Memory and some Microcontroller devices. Clicking the Auto Select button will enable the programmer to identify the ID on the device and will select the matching device in the library automatically.

> ***NOTE**: If you have a "Device not found" message, select the device manually. If you have old devices or defective devices, the **TopMax** will not be able to recognize the ID code from your device.*

Device / Blank Check

The Blank Check function is used to verify whether or not a device is in an erased or unprogrammed state.
All EPROM (Erasable Programmable Read Only Memory) devices should be checked before programming. EEPROM (Electrical Erasable Programmable

Read Only Memory) based parts do not need this command because EEPROM's are erased automatically before programming.
PLD based parts are checked by verifying all of the fuses that are intact. Any erased PLD's should pass this test.

> ***NOTE**: Erasing EPROMs. In order to clear data in an EPROM, the chip should be exposed to a short wave UV (Ultra violet) light. Most erasers require between 5 and 30 minutes to erase an EPROM. Some types of chips take longer to erase than others. An EPROM based part (a PLD or Microcontroller) with a security bit feature is designed so that the security address is typically the last bit to be erased. If the window of a chip is not clear, try cleaning the window with alcohol or a solvent. Erase chips if the chips are exposed to sunlight and fluorescent light for months or years; your chips can be erased. You should cover the window of the programmed chips with an opaque label to make the data permanent. Some EPROM based parts can't be erased because they do not have a window. These chips are called one time programmable (OTP) EPROMs.*

An EPROM has a quartz window located on the chip just above the die. An EPROM is erased by exposing it to high-frequency ultra-violet light waves. Erasing an EPROM usually takes from 15-20 minutes, but may be shorter or longer, depending on the device. Many manufacturers make EPROM erasers. If you wish to purchase an eraser, call E. E. TOOLS at 408-734-8184. When an EPROM is not being erased, the window may be covered with an opaque label. Sometimes (over a period of years) an EPROM will start to erase due to the level fluorescent light in the room. Direct exposure to sunlight also has this effect and happens much more rapidly and commonly.

> ***NOTE**: In order to decide if the device is blank, the user should read the target device. If the buffer is filled with all FFs or 00s, the device is most likely in an erased or unprogrammed state; otherwise, the device is not erased.*

> ***CAUTION**: Some devices such as Philips P98C52 can pass the BLANK CHECK routine after they are secured even though they are not blank.*

Device / Program

Program command will enable you to place new data from the memory buffer into the target device. The BUSY GREEN LED will be blinking during programming. Make sure the device is correctly inserted into the ZIF socket and

the latch is down. Then check the buffer device address range before you start. The values will default to the size of the device.

***NOTE*: <MOTOROLA MICROCONTROLLERS>**

The window of windowed devices must be covered with an opaque label during operation at all times.

***NOTE:** For all DEVICE/FUNCTION operations, the ERROR YELLOW LED, located at the bottom of the ZIF socket is used to indicate the status of the complete operation. It will turn on if an error has occurred; otherwise it will remain off.*

- **Memory device**

The target device must be blank checked unless the part is electrically erasable. Although most of EEPROMs and Flash Memory devices have the ERASE function in the menu, some EEPROMs such as AT28CXXX or AT29CXXX don't have the ERASE function. Note that EEPROMs without the ERASE function are automatically erased before programming.

- **Programmable Logic Device operation**

After programming is complete, verification should be performed according to the semiconductor manufacturer's specifications. In order to test vectors, a vector test should be performed (See vector test under the TEST menu). Finally, the part may be secured so that its content can no longer be examined or modified. The security function will not execute if the device fails to verify or pass the vector test properly.

- **28C256, 28C010, etc.**

28CXXX family devices support Software Data Protection. The user has an option of either protecting or not protecting the data. This option must be changed before the start of any programming operation. To change this option, go to the Option selection under DEVICE/FUNCTION menu and make any changes accordingly. To obtain more information about Software Data Protection, please consult the device manufacturer's specification.

- **Microchip PIC devices**

Microchip PIC series is different from other Microcontrollers in that they have an EPROM area as well as a CONFIGURATION FUSE. The configuration fuse in the PIC family is used to setup **Oscillator Type, Memory Code Protection, Watchdog Timer, or Processor Mode,** and etc. After programming the EPROM portion, change the fuses of the items listed under **Option**. Then you must program the configuration option in the **Option** menu.

Perform the following procedure:

1. Program the main memory
2. Click on the OPTION button
3. Set all of the configuration fuse in OPTION menu
4. Click on the Program configuration fuses button
   You may also read the status of the Configuration Fuse under the OPTION selection.
   In order to obtain more information about programming the configuration fuse, contact Microchip technology at 602-786-7200 or consult the appropriate data book.

Copy from a master chip to a new chip

1. Select the master device from select menu in Microcontroller.
2. Put the chip on the ZIF socket.
3. Click on the **Device** button and read the chip.
4. Click on the **Option** button and read the fuses.
5. Write down all of the option fuses [the memory protect must be disabled] in order to copy the information from your master chip.
6. Place a new chip. It must be the same chip as the master chip.
7. The buffer still holds your master data and **the memory portion.**
8. Click on **Option** again and set all the fuses that you wrote.
   (To change the option, use the arrow button in the selection box.)
9. In the same **Option** menu, Click on the **program configuration fuses**, read and compare the fuses with your original device.

> ***CAUTION**: The **PIC16C711**, will be used as an OTP (one time programmable) chip when you erase the secured device. You cannot reuse the chip after erasing it, even though the PIC16C711 is an erasable device.*

- **Serial EEPROMs**

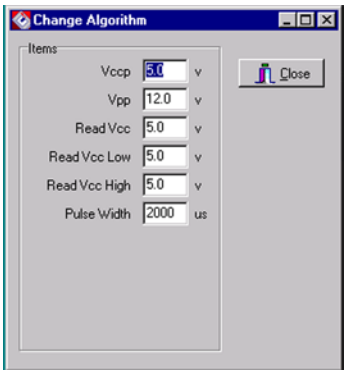
These devices are electrically erasable, but they operate serially rather than parallelly.

- **Atmel or Xilinx 17xxx**

You need to set the POLARITY FUSE with this family via the Option menu. After programming the main MEMORY, go to the OPTION menu and make the appropriate change. On OTP (One Time Programmable) devices, the POLARITY FUSE status cannot be reversed once it has been changed. Even on some of the windowed 7xxx family devices (excluding Xilinx 17xxD/L & 17128), the POLARITY FUSE cannot be toggled. Consult the device manufacturer for further instructions on how to handle the Polarity FUSE.

***CAUTION**: Do not touch or remove a device during an operation nor when the BUSY GREEN LED is on.*

Device / Change Algorithm



Users are provided with an option of changing the programming parameters of most devices. Once you select the "Change Algorithm" option under the DEVICE menu, the user will be presented with a list of device specific programming parameters, such as Vccp, Vpp, Read Vcc, Verify Vcc Low, Verify Vcc High, Pulse Width, Over Pulse Width, Over Pulse Mul, and Retry number. Each of these parameters can be selected and edited individually by changing the existing numbers in the parameter box and pressing the close button. The user will then be prompted to enter the new value for that parameter.

***CAUTION**: Please note that before deciding to modify any programming parameter, the user must consult the manufacturer programming specification for that device.* E.E. Tools *will not be responsible for any damages caused by any unauthorized modified programming parameters. Any changes in programming parameters are temporary and the original parameter's value will be restored once the operation on that device is complete. However, the user can store the modified programming parameter for a particular device by using Macro command.*

Device / Read

Read the data in the source device mounted on the ZIF socket into the buffer for examination.
The checksum will be displayed on the checksum line. The buffer may be edited, saved to a disk, or used to duplicate the chip.

***CAUTION**: Reading the device into the buffer destroys the buffer contents through the specified range. Make sure everything in the buffer that is needed has been saved.*

PLD test vectors are not stored in a logic device; therefore, they cannot be read. The test vector buffer will be empty after reading the PLD.

> ***NOTE**: Devices that have been secured cannot be read properly. Secured chips may appear all blank, fully programmed, or scrambled.*

Device / Verify

Assures that data in the device matches data in the memory buffer. If your device has the security fuse blown, a verification error is detected. The verify operation requires that the exact data pattern or file that was used to program the device be resident in the memory buffer.

Device / Data Compare

Compares the data in device to the data in buffer and saves any difference into the COMPARE.TXT file. When you have a verify error during the ***Verify*** operation, the ***Data Compare*** command will be useful. It will detect a difference between the device content and the buffer content and will write the difference into the COMPARE.TXT file under the **TopMax** directory. You may view the file using an edited utility software.

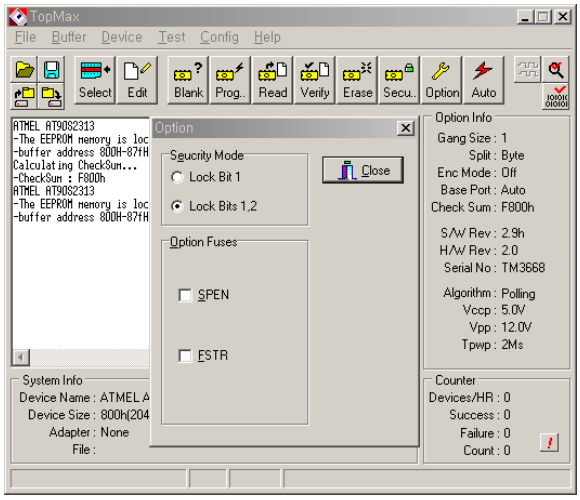
Device / Erase

This option erases the data in your socket before programming it. This operation is valid for only limited devices such as EEPROM, Flash Memory, GAL, PEEL devices. EPROMs that have a window should be erased by UV EPROM erasers externally (see NOTE "Erasing EPROMs" in this manual).

Device / Security

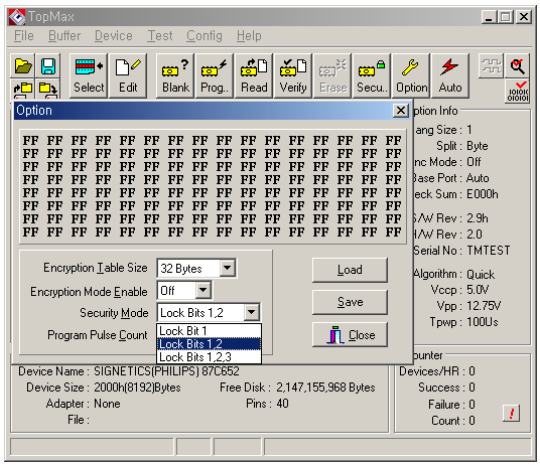
Secures a PLD or Microcontroller so that their content can no longer be examined or modified. Security is confirmed when valid data can no longer be read or verified against a previously read pattern. To ensure that the security fuse has been blown, the ***Security*** operation is preceded by a "read" of the device and followed by a "verify".

> ***NOTE**: Usually, on a UV erasable PLD or a Microcontroller, a secured device may take longer to erase because the security bit address is designed to erase last.*



***NOTE**: When you click on OPTION, device security mode and option fuses will be available for certain manufacture devices. Selecting these options, TopMax will program your device with the checked options continuously. It is a useful feature for users who like to program devices in volume quantities. The user does not have to set the fuses or security modes for every programming.*

***CAUTION**: Some devices, such as Philips P89C52, can pass the BLANK CHECK routine after they are secured. Securing a device separates the programmed data pattern from unauthorized access. This command appears only when the selected device supports it. Some Microcontroller's and PLDs can be secured by programming a special address location. The security bit will be cleared when the device is erased. Once a device is secured, it cannot be unsecured to read, verify, or duplicate. Also the secured device is seen as a blank chip even though it is not actually blank.*

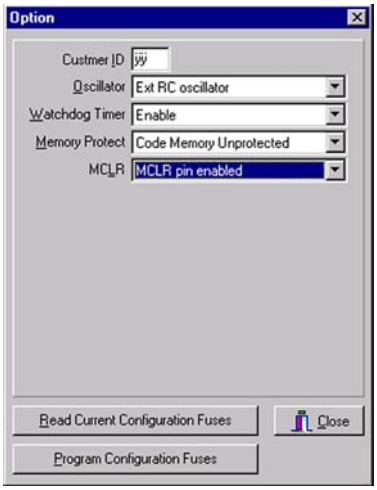


Device / Encryption

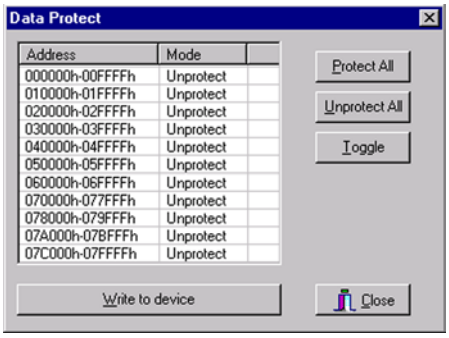
The encryption table is a feature of the 87C51/87C52 family Microcontroller devices. The Encryption array of the Microcontroller is initially unprogrammed (all '1's). In order to protect the code from being easily read by anyone other than the programmer, this feature allows you to program the encryption table that is exclusive NORead with the program code data as it is read out. You have to know its content in order to correctly decode the program code data. Thereafter you will have to use the same displayed encryption array any time you need to read back the device.

Device / Option

Device/Option /Customer ID
The user can store checksum or other code-identification numbers.
Device/Option / Oscillator
Most PIC device family's can be operated in four different oscillator modes. The user can choose one of the following modes from the factory.
LP: Low Power Crystal
XT: Crystal/Resonator
HS: High Speed Crystal/Resonator
RC: Resistor/Capacitor

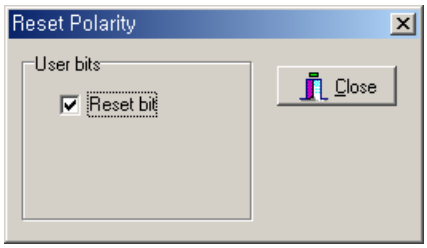


Device/Option / WATCHDOG TIMER (WDT)
WDT is a configuration bit of special features for PIC device family's.
Device/Option / POWER-UP TIMER
This is a special feature for the PIC device family.
Device/Option / Memory Protect
This configuration fuse can be used to protect against spurious EEPROM writes.
Device/Option / Data Protect



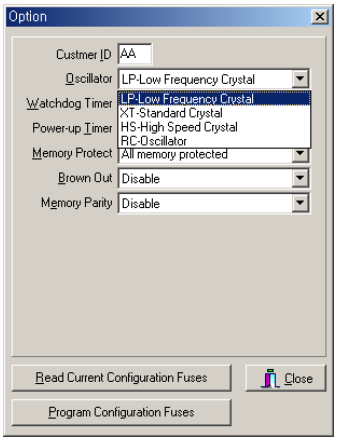
This feature may be enabled or disabled by the user; when shipped from an IC manufacturer, the DATA PROTECT feature is disabled.
Devices have "Software Data Protection (SDP)"
Provides software features to protect nonvolatile data from in advertent writes.

Disable: The SDP command will not protect the entire memory array.
Enable: The SDP command will protect the entire memory array.
Certain Flash device has "Sector Protection"
Protect All: By pressing the Protect All, no data will be erased or written into the device. You can still read data from the device. The block(s) doesn't allow the device to be erased or programmed
Unprotect : The selected block(s) allows the device to be erased or programmed.
Toggle: Change the block status in reverse.
Write Device: The selected block status will be written in the device.
Close: Exit to main menu.
Device/Option / Reset Polarity
Reset Polarity (for Xilinxl FPGA): The Polarity Fuse is ACTIVE HIGH when shipped from an IC manufacturer. To change the polarity, click on the Option button and check on the Reset bit box before programming your device. Once it changes to ACTIVE LOW, it may not reset the ACTIVE LOW fuse to ACTIVE HIGH. On OTP (One Time Programmable) devices, the POLARITY FUSE status cannot be reversed once it has been changed. Even on some of the windowed 7xxx family devices (excluding Xilinx 17xxD/L & 17128), the POLARITY FUSE cannot be toggled. Consult the device manufacturer for further instructions on how to handle the Polarity FUSE.



Device/Option / Drown Out
This is a special feature for the PIC device family.
Device/Option / MCLR
This is a special feature for the PIC device family.

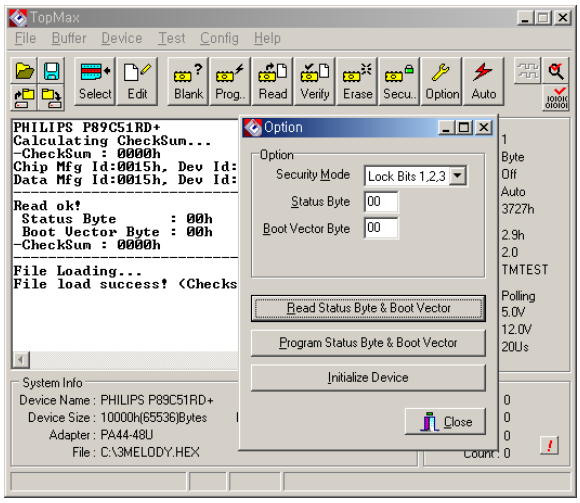
Device/Option / Memory Parity
This is a special feature for the PIC device family.



Device/Option / Low Voltage PGM
This is a special feature for the PIC device family.
Device/Option / FLASH Write Enable
This is a special feature for the PIC device family.
Device/Option / Background DBG
This is a special feature for the PIC device family.
Device/Option / Brownout Voltage
This is a special feature for the PIC device family.

> ***NOTE****: All the Options above are described in the device manufacturer's data book. Make sure that you understand all configuration features before setting the configuration fuses.*

Option Item/Read Current Configuration Fuses
In order to have the information of all configuration fuses, press this button and you can see all configuration data of the current device. Be sure that you remember all the fuse's information if you want to copy the configuration information
Option Item/Program Current Configuration Fuses
Pressing this button will store all configuration fuse's information in the current device located in the programmer socket.



Device/Option/Read Status Byte or Boot Vector

In order to have the information of option bits, press this button and you can see all option lock bit data of the current device. Be sure that you remember all the fuse's information if you want to copy the configuration information.

Device/Option/Program Status Byte or Boot Vector

Pressing this button will store all lock bit information in the current device located in the programmer socket.

Device/Option/Initialize Device

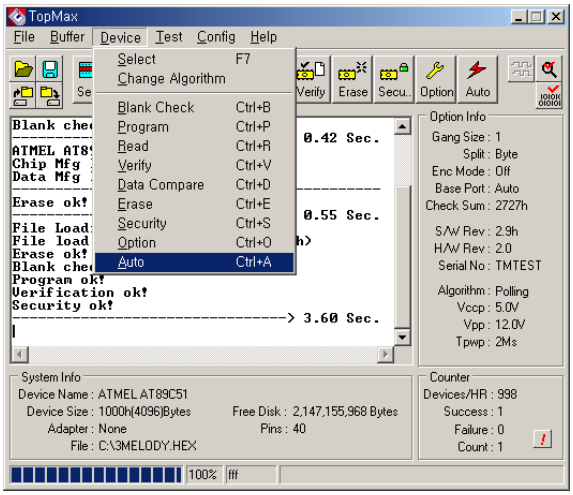
Initialize function erases the whole memory array, security lock bits, status byte and boot vector into their initial arased state. Pressing this button before erasing all 89Cxx family manufactured by Philips.

Device / Auto

Auto command will enable you to do the following steps sequentially and it is useful to program a volume quantity device with the same data.

ERASE
BLACK CHECK
PROGRAM
VERIFY
SECURITY

> ***CAUTION****: Some devices such as Philips P98C52 can pass the BLANK CHECK routine after they are secured without being blank. Securing a device prevents the programmed data pattern into the device from unauthorized access. This command appears only when the selected device supports it. Some Microcontrollers and PLDs can be secured by programming a special address location. The security bit will be cleared when the device is erased. Once a device is secured, it cannot be unsecured to read, verify, or duplicate. Also the secured device is seen as a blank chip even though it is not actually blank.*



Test

Test / Vector Test

Verifies that the PLD (PAL, GAL EPLD, etc.) behaves currently without having to prototype a circuit. In order to perform test vectors, test vectors should be in the JEDEC file when the file is loaded. Most PLD development software will generate valid test vectors automatically. Test vectors may be examined and modified with **Vector Pattern Edit/^F6** command in the buffer menu screen.

> ***NOTE**: Due to hardware's limitation, Vector Test is only implemented on 24-pin or less devices.*

During the vector test, **TopMax** applies high and low signals to the input pins of a tested PLD and observe signals at the output pins. The output results are compared to the expected results from the test vectors. Any difference will show up as an error message.

The following are valid characters for test vectors:

0	Apply input logic low (Vil) to an input pin
1	Apply input logic high (Vih) to an input pin
C	Clock an input pin (Vil, Vih, Vil)
F	Float pin
N	Power pin or untested output pin
V	VCC pin
X	Don't care: output values are not tested
G	GND pin
K	Clock an inverted input pin (Vih, Vil, Vih)
H	Expected result on output pin is Vih
L	Expected result on output pin is Vil
Z	Test for high impedance

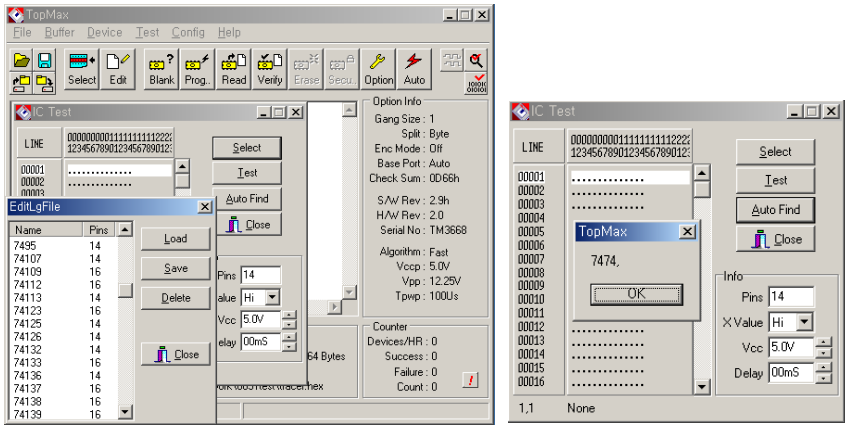
Optional Operation

X value	Optional value of "don't care"
Vcc	Test Vcc value on Vcc pin
Delay	Test period of each vector in milli-second

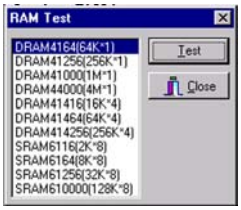
Test / IC Test

This operation tests TTL or CMOS logic devices according to the test patterns stored in the test pattern library.

Click on the **Select** button and enter a device name and click on **Test** to begin the test function. A result message will be displayed after testing.



Test / RAM Test



TopMax provides an additional memory test function. This operation tests static and dynamic RAM memory chips. The following memories are tested:

DRAM types tested

- 16K*4, 64K*1, 64K*4, 256K*1, 256K*4, 1M*1

SRAM type tested

- 2K*8, 8K*8, 32K*8, 128K*8

After inserting a memory device into the ZIF socket, select the memory type from your menu screen and click on the **Test** button.

The program will test each address of the memory. A "Defective memory" message will be displayed with a current address if the memory has a defective bit. "Good memory" will appear when the test has passed successfully.

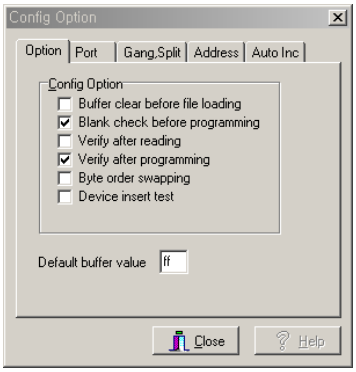
Config

Config Option

Config Option / Default Buffer Value

Fill the buffer value (hexadecimal) with the initial data that you type in this field. This feature helps the user who wants to have different initial values ('00' or 'FF') in the buffer. Once you have made this change, exit to DOS, and restart the TopMax to get the result of the change.

Config Option / Buffer Clear Before File Loading



When loading a file into the buffer, executing the ENABLE option fills the buffer with the data that is defined in Default Buffer Value before the file is loaded into the buffer. When you load a file that is smaller than the current buffer size, the unfilled buffer will contain the Default Buffer Value so that you may examine the buffer data more conveniently. DISABLE option keeps the same data for the unfilled buffer area after Buffer Load command is executed.

> ***NOTE**: Buffer Clear means that the current buffer will be filled with the Default Buffer Value. It can be any data of Hexadecimal values such as FF, 00, or XX*

.

Config Option / Blank Check Before Programming

Enabling Blank Check Before Programming verifies whether the device is erased before programming. Disabling Auto Blank Check Before Programming prevents this check from occurring.

Config Option / Verify After Reading

Setting the configuration menu to ENABLE will allow you to verify whether the device data is the same as the data in your current buffer after reading the source device.

Config Option / verify after programming

Setting the option to ENABLE will allow you to verify whether the device data is the same as the one in your current buffer after programming a device.

Config Option / Byte order swapping

This option applies only to 16-bit wide (E)EPROMs or Flash Memory. User data is displayed in the buffer according to the Intel convention with the default value set at **Disable.** Enabling this option allows you to use data according to the Motorola convention during ***Program*** and ***Verify*** operations under the ***Device*** selection. However, the data in the buffer is not physically swapped.

When enabled, the MSB (Most Significant Byte) of data is located to EVEN addresses (0,2,4,...) and the LSB(Least Significant Byte) of data is located to ODD addresses(1,3,5,...).

For example, Byte swap is useful if an assembler creates a file in Intel format, in which the low byte is read before the high byte, but the file must be in Motorola format, in which the high byte is read before the low byte.

Sample data file (Motorola EXORmacs Format, Code 87):

S00B0000444154412049F4FF3
S11300000123456789ABCDEF001122334455667750
S9030000FC

Data file opened with format 87 and displayed in the editor (8-bit addressing mode):

CURSOR AT LOCATION: 00000000 8 BIT ADDRESSING

	HEXADECIMAL															ASCII
ADDRESS	-0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-A	-B	-C	-D	-E	-F	0123456789ABCDEF
00000000	01	23	45	67	89	AB	CD	EF	00	11	22	33	44	55	66	77	.#Eg . . "3Duf w
00000010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	

Example #1: Programming one 16-bit device (Data word width = 16, Odd/even byte **swap = disabled**)

The user data is allocated as follows:

		Device	
		MSB	LSB
Device Address:	0	23	01
	1	67	45
	2	AB	89
	3	EF	CD

Sample data file (Motorola EXORmacs Format, Code 87):

S00B0000444154412049F4FF3
S11300000123456789ABCDEF001122334455667750
S9030000FC

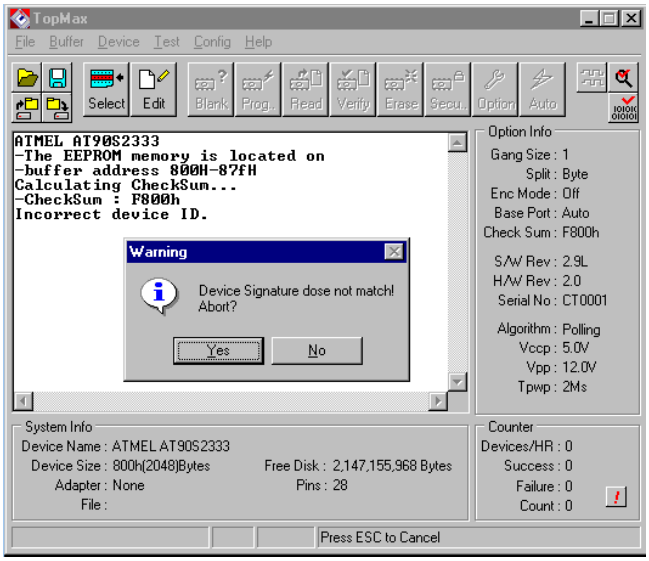
Data file opened with format 87 and displayed in the editor (8-bit addressing mode):

```
CURSOR AT LOCATION: 00000000    8 BIT ADDRESSING
          HEXADECIMAL                                   ASCII
ADDRESS   -0 -1  -2  -3  -4  -5  -6   -7  -8 -9  -A  -B -C -D -E -F    0123456789ABCDEF
 00000000  01 23 45 67 89 AB CD EF 00 11 22 33 44 55 66 77 .#E.g. . . "3DUf w
 00000010  00 00 00 00 00 00  00  00 00 00 00 00 00 00 00 00
```

Example #2: Programming one 16-bit device (Data word width = 16, Odd/even byte **swap = Enabled**)
The user data is allocated as follows:

		Device	
		MSB	LSB
Device Address:	0	01	23
	1	45	67
	2	89	AB
	3	CD	EF

Config Option / Device Insert Test



When enabled, this test will allow the TopMax to first examine the physical position of a device as it is sitting in the programming socket when the user attempts to take any action to that device. Once it has finished examining, the TopMax will prompt the user for corrective steps if needed depending upon the position of the device. Once you click on "Device Insert Test", TopMax will display "Incorrect device ID" if your target device contains ID or if wrong device is placed inside the socket. You may see the same message if the device has been secured or if the device ID has been erased. Click on "Yes" if you want to ignore the manufacturer's device ID and proceed.

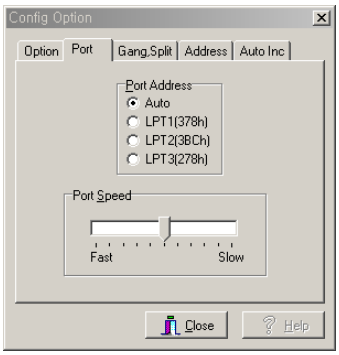
Config Option / Auto Repeat Programming

(Under development)

Setting this option to ENABLE allows you to do the same routine continuously by replacing & closing the ZIF socket. This command is useful for production programming. In order to program multiple devices continuously with the same data in the current buffer, set this option ENABLE and program the target devices as AUTO mode in the FUNCTION menu. By replacing the programmed device with a new (erased) device, AllMax software allows you to program the same type of devices without other commands.

> *CAUTION: Auto Repeat Programming will blow the security fuse in GALs and PALs. The* **AUTO** *mode in Device menu executes Blank Check, Program, Verify, and Security commands automatically. If you don't want to blow the security fuse of your devices, set this mode to DISABLE (UnClicked) and program your chip manually step by step in* **Device** *menu.*

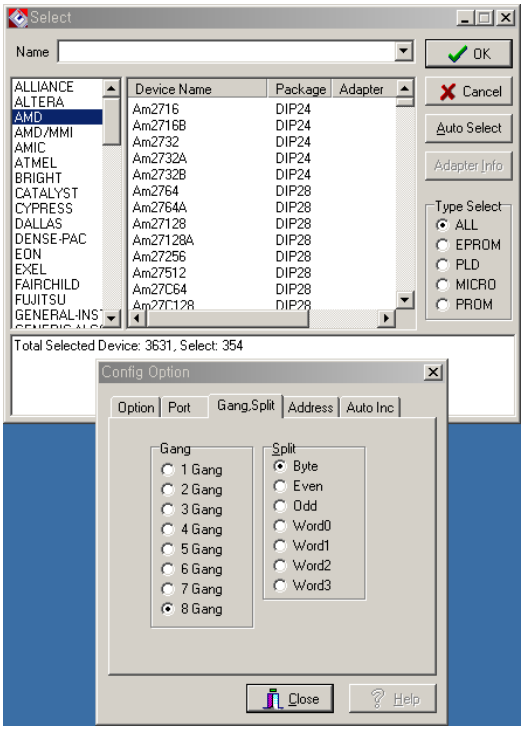
Config Option / Port



The parallel port address is determined by the TopMax software.
Auto: TopMax will select a valid parallel port as the default address in your PC.
LPT1: The parallel port 378 in HEX will be chosen for TopMax address.
LPT2: The parallel port 3BC in HEX will be chosen for TopMax address.
LPT3: The parallel port 278 in HEX will be chosen for TopMax address.
Port Speed: Because the ISA-bus clock speed is not as fast as that of the CPU, we designed this option to facilitate the problem caused when using a fast computer such as Pentium 90/133/166 MHz. The default value is 0. For computers that have CPU speed of greater or equal to 133 MHz, we recommend that you set the Port Delay to 40. In most cases, this option will help to solve the communication problem between your PC and the TopMax.

***NOTE**: The TopMax power switch should be ON. The parallel cable is connected between TopMax and your PC parallel port. Make sure that the shields on each side of the cable are locked. See section 6 Troubleshooting if you are having difficulty with installation and communication.*

Config Option / Gang Split Select



Gang

TM-8G programs multiple E(E)PROMs up to eight devices at the same time. In order to program multiple E(E)PROMs, users must use **TM-8G**. The **TM-8G** is especially useful when it is necessary to program many devices with the same data simultaneously. The **TM-8G** is designed for multiple programming and it does not support set programming.

•TM-8G can only be used for most EPROM/Flash devices and cannot be used for GALs, PALS, etc. The software will inform you when you try to select gang mode for an unsupported device.

• Place the TM-8G on top of the TopMax with all handles pointing in the same direction as the TOPMAX socket.

• If the device requires a PLCC adapter contact *E.E. Tools, Inc.*, to obtain the correct adapter.
• From the software menu Device/Gang Select, select 8-Gang Mode. If you receive the "Cannot be selected for 8-gang" message, then it is not possible to program that particular device with the 8-gang adapter.
• Be sure that all devices are of the same brand, size and part number, otherwise TM-8G will not function correctly.
• If any (one) chip is defective, the TM-8G will not Program/Verify/Blank Check any of the devices and you will get an error message. Also note that a device may be defective even though the BLANK CHECK passes.

> ***CAUTION**: The 48-pin(TM-A48) socket should be used for universal devices including PLD, and special Microcontrollers such as PICxx, 87C5X, 89C5X programming. Since **TM-8G** adapter has 32-pin sockets, the device support on **TM-8G** is valid for limited device programming such as E(E)PROMs and Flash Memory. In order to program multiple devices using the 8-gang socket, you should use devices with the same manufacturer and type. All of the devices should be inserted into the socket with notch in the same direction as pictured on case.*

> ***NOTE**: For 8-gang adapters that support several special family's such as 32-pin PLCC, 40-pin DIP(16bit EPROM, 87C5x) , PICxx device, and other devices, please refer to the TopMax 8-gang adapters in the back page in this manual. We are planning to introduce the most demanded 8-gang adapters promptly.*

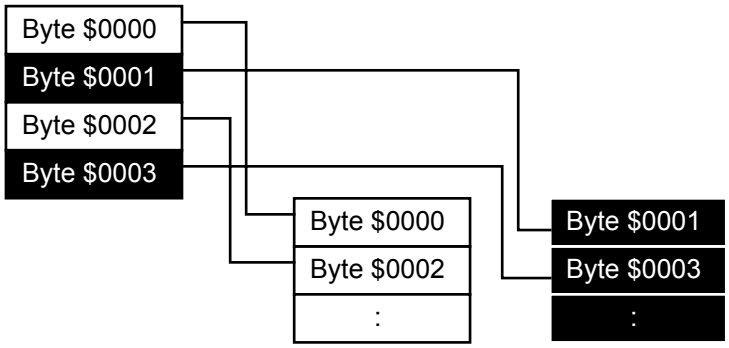
Split

When programming devices for a 16-bit or 32-bit environment, you will need to split your data onto two or four devices.

> ***NOTE**: SPLITTING DATA is different from SETTING DATA. Putting buffer data into multiple devices is called "SET DATA". TopMax doesn't support the SET DATA.*

■ Split Programming Examples

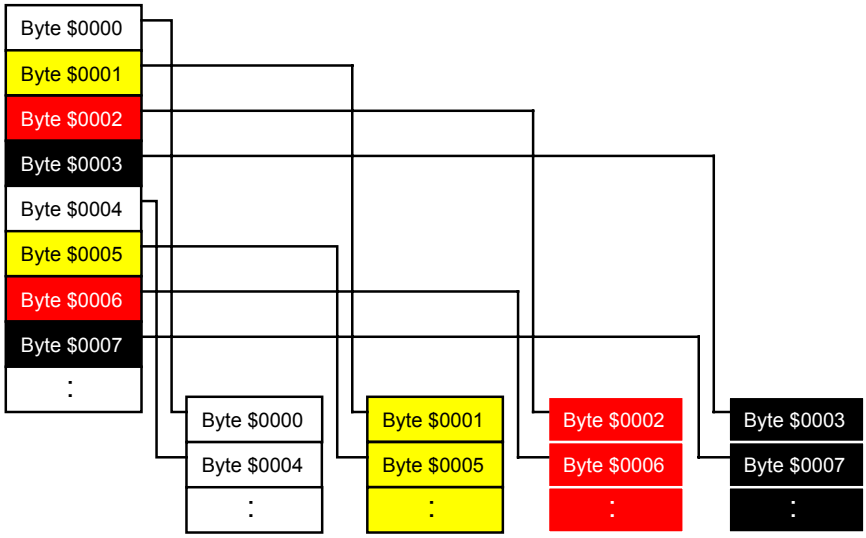
EXAMPLE 1: PROGRAMMING TWO 8-BIT EPROM AS FOLLOWS:



1. Load a 16-bit file into the buffer.
2. Select the target device from menu.
3. Insert the target device (#1) into the ZIF socket.
4. Invoke EVEN in Split data menu.
5. Program the device (#1).
6. *Remove the device (#1) and insert the second device (#2) into the ZIF socket.*
7. Invoke ODD.
8. Program the second device.

Now, you have two 8-bit EPROMs that have been programmed. The first EPROM (#1) contains all the even address or low bytes and the second (#2) device contains all the odd address or high bytes.

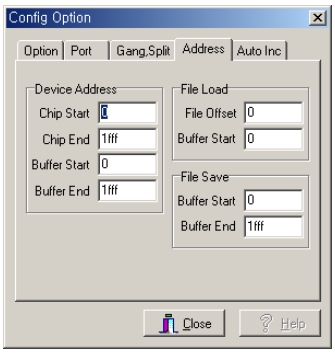
EXAMPLE 2: PROGRAMMING FOUR 8-BIT EPROMS AS FOLLOWS:



1. Select the target EPROM.
2. Load the HEX file (32-bit file) into the buffer.
3. Insert the first EPROM (#1) into the socket.
4. Invoke Word 0 in Split Data menu.
5. Program the mounted device.
6. *Remove the programmed device (#1) and insert the second device (#2) into the socket.*
7. Follow the same steps as above.

After programming the 4th EPROM with Word 3, you will have four 8-bit programmed EPROMs. The original file (32-bit) is split into four EPROMs that contain 8-bit data in each device.

Config Option / Address



Chip Start: Device Starting address for the data to be programmed in buffer.
Chip End: Device Ending address for the data to be programmed in buffer.
Buffer Start: Buffer Starting address for the data to be programmed.
Buffer End: Buffer Ending address for the data to be programmed.

NOTE: Device size for different devices

Device	Device Address
2716	0 - 7FF
2732	0 - FFF
2764	0 - 1FFF
27128	0 - 3FFF
27256	0 - FFFF
27010/1024	0 - 1FFFF
27020/2048	0 - 3FFFF
27040/4096	0 – 7FFFF

File Load

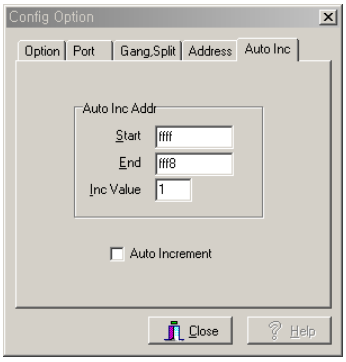
File Offset is subtracted from addresses from the file downloaded to the programmer. For example, if you set File Offset to 1000h, then the downloaded data minus 1000h would be placed into the buffer at the address specified by the **Buffer Start Address.**

Buffer Start Address is the address in the buffer where you want your downloaded data to start. For example, if you set Buffer Start Address to 800h, then the downloaded data only appears in the buffer beginning at address 800h.

File Save

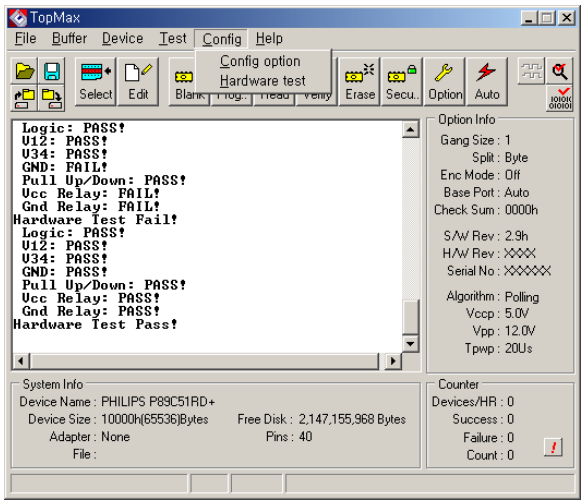
Buffer Start: Starting address for data to be saved.
Buffer End: Ending address for data to be saved.

Config Option / Auto Inc



The feature allows users to program a certain area that might contain a serial number in the memory device with serialized number by a certain value.
Start : Start address of memory that contains serialized data
End : End address of memory
Inc Value : This value will be added to the previous data value
User must click on Auto Increment to program a memory with data increased by one to the previous data.

Config / Hardware test



A hardware test is designed to assist customers in confirming and diagnosing problems relating to the TopMax programmer. If a hardware defect with the TopMax is suspected, the user is recommended to run this test in order to confirm whether or not a problem has occurred with the programmer. The test that pertains to users is the "Pin driver self test." When executed, TopMax will show a "Hardware Test Result" box in which the status of Pin Drivers (Logic, V12, V34, GND) for each pin from 1 to 48 of the programming socket is displayed. A smiling face symbol (☺) at a particular pin and a particular Pin Driver indicates that the Pin Driver for that pin is "good." An exclamation mark (!) indicates that the Pin Driver for that pin is "bad." In any event, the TopMax displays the overall result of the test as either "FAIL" or "PASS" at the bottom of the displayed box.

7. TROUBLE SHOOTING & TECHNICAL SUPPORT

This section provides customer support information such as the return material authorization policy as well as methods of obtaining *E.E. Tools*' technical assistance and software updates.
The TopMax is designed to require a minimum of technical support for both hardware and software. Since we make the product in the USA, we are supplying qualified programmers as trouble-free as possible.

1. Registration

A registration card is located in the user guide manual with the software diskette. Complete the card and return it to *E.E. Tools* to become eligible for:
• Customer support, warranty service and technical assistance
• Notification and special pricing on new products and upgrades

Registration is particularly important if the programmer was purchased from a dealer, a distributor or through your purchasing department. Why not take a moment right now to complete the card?

2. Software Updates

Your programmer is designed to be highly flexible and programmable, allowing it to program a wide variety of chips. Consequently, when a problem does arise, it can usually be fixed with just a free software update. The new software updates are available from our WEB page at **www.eetools.com**, file name: TOPMAX.EXE or TOPMAXW.EXE for WIN95/98/NT/2000 version.
Use the new software if you have any other incorrect programming results.

3. Testing the Hardware

Make sure that your programmer works properly before you call us for technical assistance. Refer to Hardware Test section in the Config menu.

4. Quick Self-Diagnostics

In order to provide accurate and fast technical assistance, we recommend that you check the following information before you call our technical support department. We recommend that you obtain the latest software revision before calling our support line with a software problem. Eighty percent of our technical support calls result in asking the user to obtain the latest version of the software.

- Be sure the device selected matches the device being used.
- For a device that uses an adapter, be sure that the adapter is correctly oriented, seated properly, and the ZIF socket lever is down.
- Be sure power cord is securely attached to programmer and power pack to wall socket.
- Be sure that power switch is ON.
- Be sure that the parallel cable (IEEE standard, 25 pins and wires) is correctly and securely attached to the programmer and PC. The connection must be direct; there cannot be any software keys or locks between the parallel port and the programmer. Most switch boxes may also cause difficulties.
- You may need to change your printer port [even though it is working fine with your printer] because the TopMax communicates with your computer via the printer port in a bi-directional mode.

5. Calling Customer Support

6.

E.E. Tools provides telephone technical assistance during normal business hours (9:00 AM to 5:00 PM, Pacific time).

- Please call our Technical Support Department or your local *E.E. Tools*' distributor while you are at your computer and be prepared to repeat the sequence of steps leading up to the problem
- Have the following information ready when you call:

  - The invoice number for the user who bought the TopMax from *E.E. Tools*.
  - The distributor's name and the purchased date.
  - The model & serial number found in the posterior side of the programming module.
  - Your hardware software revision number from the option info screen.
  - Description of problem with error message.
  - The exact part number you are working with.

6. Service Information

Before sending a unit in for service, call us at 408-734-8184 to obtain a Return Authorization Number (RMA). We will not repair your unit unless an RMA was issued.

Warranty Service: Please return the product in the original package with proof of purchase to the below address. Clearly state in writing the performance problem and send any leads, connectors and accessories that you are using with the device.
Non-Warranty Service: Return the product in the original packaging to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device. Customers not on open account must include payment in the form of a money order or credit card. For the most current repair charges contact the factory before shipping the product.

Return all merchandise to *E.E. Tools, Inc.*, with pre-paid shipping.
The flat-fee repair charge includes return ground shipping to addresses in North America only. For overnight shipments and non-North America shipping fees contact E.E. Tools, Inc.

550 Weddell Dr. Suite 5
Sunnyvale, CA 94089, USA
TEL: (408) 734-8184
FAX: (408) 734-8185
Email: support@eetools.com

Include with the instrument your complete return shipping address, contact name, phone number, and description of problem.

7. Limited One-Year Warranty

E.E. Tools, Inc., warrants to the original purchaser that its product and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

E.E. Tools, Inc., will, without charge, repair or replace, at its option, defective products or component parts. Returned products must be accompanied by proof of the purchase date in the form of a sales receipt.

To obtain warranty coverage in the U.S.A., this product must be registered by completing and mailing the enclosed warranty card to:
E.E. Tools, Inc., 550 Weddell Dr. Suite 5
Sunnyvale, CA 94089, USA within fifteen (15) days from proof of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. It is void if the serial number is alternated, defeated, or removed.

E.E. Tools, Inc., shall not be liable for any consequential damages, including without limitations to damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

Model Number:_____ Date Purchased:_____

8. Useful Web Site Addresses/ Phone Numbers

E.E. Tools .....www.eetools.com
ALTERA .....www.altera.com
AMD.....www.amd.com
INTEL..... www.intel.com
ATMEL .....www.atmel.com
CYPRESS.....www.cypress.com
DALLAS SEMI. .....www.dalsemi.com
HITACHI.....www.halsp.hitachi.com
INTEL.....www.intel.com
ISSI.....www.issi.com
LATTICE SEMI. .....www.lattice.com
MITSUBISHI .....www.mitsubishi.com
MICROCHIP .....www.microchip.com
MOTOROLA.....www.motorola.com
NATIONAL SEMI. .....www.national.com
NEC .....www.nec.com
OKI SEMI. .....www.okisemiconductor.com
PHILIPS SEMI. .....www.semiconductors.philips.com
ROHM .....www.rohm.com
SEEQ .....www.seeq.com
SILICON STORAGE .....www.ssti.com
ST MICRO .....www.st.com
TEMIC.....www.temic.com
T.I. .....www.ti.com

TOSHIBA.....www.toshiba.com
WAFERSCALE.....www.waferscale.com
WINBOND.....www.winbond.com
XICOR.....www.xicor.com
XILINX .....www.xilinx.com
ZILOG .....www.zilog.com

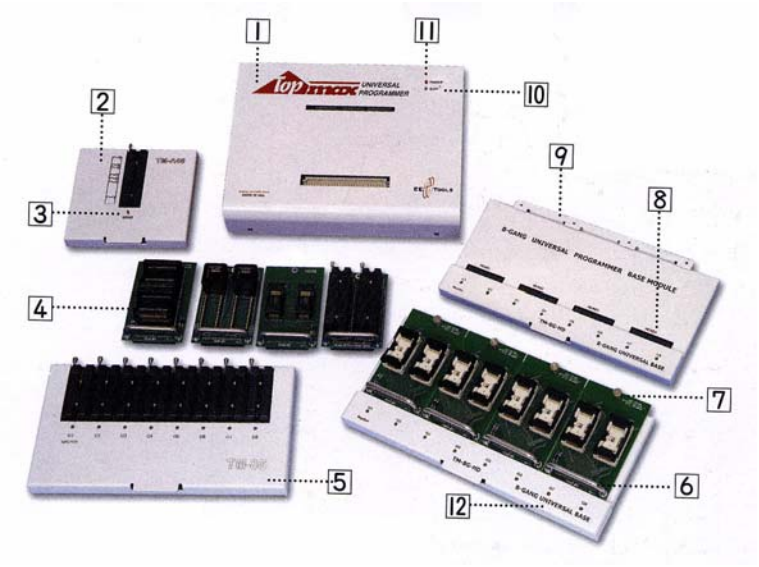
9. Programming Adapter Manufacturers

Compass (Asia).....www.compass21.com
E.E. Tools .....www.eetools.com
Emulation Technology.....www.1800adapter.com
Emulation Solutions.....www.adapters.com
Logical System .....www.logicalsys
Iron Wood.....www.ironwoodelectronics.com

10. EPROM Emulator Manufacturers

E.E. Tools .....www.eetools.com
Tech Tools .....www.tech-tools.com

11. TopMax-8G and optional adapters



①. TopMax : Main Programming Module.

②. TM-A48 : Universal Single socket programs all devices(48 pin ZIF).

Standard TopMax package includes ① and ② . All DIP package devices up to 48 pins can be programmed directly. Different adapters for non-DIP package can be inserted into the 48 pin ZIF socket.

③. LED (ON) indicates an operation is done successfully.

④. Adapter HEADs illustration: Each HEAD contains Two sockets and usually four HEADs make 8-sockets. In order to use these HEADs, customer should use TM-8G-HD (Base Module). All HEAD part numbers can be found in the device selection menu in TopMax software.

⑤. TM-8G : 8-Gang Socket Module. It programs only EPROM/Flash memory DIP devices up to 32-pin. This module can be inserted on the ① and makes TopMax 8-Gang programmer for 32-pin DIP package.

⑥. Round Handle.

⑦. Thumb Screw.

⑧. Female Connector.

⑨. TM-8G-HD : 8-Gang Base Module. It holds all different HEADs. This base unit can be replaced with the basic 48-pin single socket (TM-A48).

⑪ LED (ON) indicates programmer is functioning

⑪. LED (ON) indicates AC power is on for programmer

⑫. TopMax 8-Gang illustration for 48-pin TSOP package : TM-8G-HD and four of HD3-48TS. This module can be inserted on the ① and makes TopMax 8-Gang for programming 48-pin TSOP package.

TopMax 8-Gang Head List

Part Number	Type Pins	Description
HD1-32DP	DIP-32	Up to 32-pin E(E)PROM, Flash Memory in DIP package
HD1-32PL	PLCC-32	All 32-pin E(E)PROM, Flash Memory in PLCC package
HD2-48ST	sTSOP-48	Samsung KM5MU0820/1620, 48-Pin sTSOP package
HD3-48TS	TSOP-48	AMD(29Fx00), Macronix (29f1610/1611), Intel(28Fx00B3), 48-Pin TSOP package
HD4-44PS	PSOP-44	AMD(29Fx00),Intel(28Fx00), Macronix 29F004 , 44-pin PSOP package
HD5-48DP	DIP-48	16-bit E(E)PROM, up to 42-pin DIP package
HD6-40DP	DIP-40	MPU51(87C51/52, 89C51/52), 40-pin PLCC package
HD7-44PL	PLCC-44	16-bit E(E)PROM, 27c1024/27c4096/29c1024, 44-pin PLCC package
HD8-44PL	PLCC-44	MPU51(87C51/52,89C51/52), 44-pin PLCC package
HD9-24DP	DIP-24	GAL 16V8, 24-pin DIP package
HD9-20PL	PLCC-20	GAL 16V8, 20-pin PLCC package
HD10-44PS	PSOP-44	OKI R27V1602D/1652
HD11-48TS	TSOP-48	Samsung NAND FLASH 128Mbit, KM29U128 , 48-pin TSOP package

HD12-44TS	STOP-44	Samsung NAND FLASH 128Mbit, KM29U64000/32000/16000, 44-pin TSOP package
HD13-20DP	DIP-20	Atmel AT89C1051/2051, 20-pin DIP package
HD13-20PS	PSOP-20	Atmel AT89C1051/2051, 20-pin PSOP package
HD14-40TS	TSOP-40	AMD AM29LV002/4/8, 40-pin TSOP package
HD15-18DP/PS	DIP-28	PIC16C83/84, 16F83/84, 16C6x/7x, 28-pin DIP package
HD16-48UBGA	uBGA-48	Intel GT28F160C3/320C3-B/T for 48-Ball uBGA package
HD17-20SP	SOP-20	Philips 87CLPC762/764 for 20-SOP package
HD18-44TQ	TQFP-44	MPU51(87C51/52,89C51/52),44-pin TQFP package
HD19-72BGA-B	FBGA-72	Intel RD28F1604/3202/3204, 72-Ball FBGA TSOP package
HD20-44PL	PLCC-44	Atmel(AT27C800), ST(M27C800), 44-pin PLCC package
HD21-32TS	TSOP-32	32-pin E(E)PROM, 32-pin TSOP package(20mm)
HD22-44TQ	TQFP-44	LATTICE ispLSI2032VE, 44-pin TQFP package
HD23-32STS	sTSOP-32	32-pin E(E)PROM, 32-pin TSOP package(14mm)
HD24-48FBGA	FBGA-48	Samsung K8D1616U(B/T)M, 48-Ball BGA package

*Additional adapters are added continuously.

Each HEAD contains two sockets.
Visit www.eetools.com for more HEADs update information.

12. TM-8G-HD Adapter Instruction Sheet

1. You must set up TOPMAX8W.EXE (WINDOW VERSION ONLY) software before using the TM-8G-HD along TopMax.
2. This adapter works only for the TOPMAX programmer.
3. It has four (4) slots that fit 4-HEADs [each head holds two sockets] to allow for EIGHT (8) gang programming. The four HEAD's are identical, so they allow you to program the same type of chips.
4. You must set up the operating software separately. The original Setup / Installation software will not work for the 8-gang programming mode.
5. The gang adapter's name for each particular device is indicated in the software ***Select*** menu. Be sure that you confirm the correct socket adapter part number before ordering.
6. Be sure that all devices are of the same brand and part number, otherwise the gang adapter will not function correctly.
7. Turn the switch of the TOPMAX off, which is located in the posterior and place the BASE header on top of the TOPMAX carefully. Insert each individual head, which contains 2 sockets. Once you place all four sockets into the heads, hold the sockets using the thumb and screw them together using the screws that came with your order.
8. Turn the switch on before running the 8-gang software. In your software menu, select your device number and choose the 8 Gang Mode in ***Config/Gang*** menu.
9. The gang adapter will perform Blank ***Check*** and Verify serially, that is one device at a time in a congruent direction from left to right.

In order to copy from a master device, you must place a master chip in the "master" socket and read it. Then you can place the blank chips in the sockets.

> ***Caution**: Be sure that all your chips are of the same size and brand. If any (one) chip is defective, the Gang adapter will not **Program / Verify / Blank Check** any of the devices and you will get an error message. Your device may be defective even though the BLANK CHECK passes!*

8. GLOSSARY

BGA Ball Grid Array. A surface mount device with solder balls and a high pin count, similar to PGA.

Bipolar PROM A fuse-link programmable PROM.

Blank Check A test performed by a device programmer to ascertain whether a device has been programmed (partial or total) or is in a virgin state.

Buffer Data storage unit directly stored on CPU.

Checksum A number that results by adding up every element of a pattern. Typically either a four or eight digit HEX number, it is a quick way to identify a pattern, since it is very unlikely that two patterns will have the same checksum.

Compare Reading a programmable device and displaying any discrepancies from the desired pattern. Each error is displayed on the screen. This comparison is slower to perform than a verify on the programmer.

Device Microchip or Integrated Circuit chip.

Die The silicon chip that is located within an IC package. It is a small rectangular flat piece of silicon that has been fabricated with many transistors to perform a specific function. It is glued into a plastic or ceramic package and connected to the external metal interconnect pins of the IC with very small bonding wires. It can be seen through the window of erasable EPROMs.

DIP Dual Inline Package. An IC package with two rows of through-hole pins, usually on 0.1 pitch, 0.3 or 0.6 inches apart.

FPGA Field Programmable Gate Array. A very complex PLD. The FPGA usually has an architecture that comprises a large number of simple logic blocks, a number of input/output pads, and a method to make random connections between the elements.

Functional Test A test that is performed following the programming of a PLD. The test operates the device in its normal operating mode by simulating the inputs and outputs that the part will experience in normal operation. To perform the test, the engineer must supply a set of test vectors that describe normal operation of the device so the device programmer can apply the specified stimulus and verify that the device is operating as designed. It is important to perform a functional test on PLDs because, in many cases, the PLD cannot be fully tested at the factory before programming so a defective PLD may program correctly but fail the functional test. A properly designed functional test will verify that the part meets the design specification, ensuring that the device, the

compiler, the programmer, and the engineer have all performed their respective tasks correctly.

Fuse A metal connection within a PLD or memory that may be melted during programming to break the circuit. These links typically carry input signals to logic gates. Burning all the fuses except those that are required in the desired circuit forms the desired circuit configuration. Since the fuses cannot be tested nondestructively, fuse-like programmable devices cannot be 100% tested at the factory and consequently expected programming yields are usually 98-99%.

GAL Generic Array Logic. EEPROM based second generation PAL devices.

Gang Programmer A multiple-socket programmer that requires each device to be placed in a socket before any can be programmed. See Concurrent Programmer.

HEX file A human-readable ASCII file that represents any binary data. Each byte in the binary pattern is represented by two HEX characters (0-9, A-F) so that any of the 256 possible bytes, which include both control and unprintable characters, may be printed. The HEX file may also contain address or checksum information. The pattern represented by the HEX file may be represented by a binary file or any of the HEX file formats – any file format may contain any pattern. The names of the HEX file formats (Intel, Motorola, Tektronix, etc.) indicate who standardized its format and does not indicate anything about the pattern or the device the pattern is intended for.

I/O Input/ Output.

JEDEC Joint Electron Device Engineering Council (pronounced JED'eck). A group organized by the IEEE (Institute of Electrical and Electronics Engineers) that has defined a standard file format for PLDs.

JEDEC file A file conforming to a standard format that specifies the configuration and testing procedure for a PLD. The file is in a human-readable ASCII format and consists of fields that start with a letter and end with an asterisk. Fields specify the pattern to program into the part, whether to secure the device, a set of test vectors to perform a functional test, and checksums to verify the integrity of the file.

LCC Leadless Chip Carrier. A square ceramic package that has no leads; Instead it has metal areas that are surface-mount soldered to the target circuit. This package is usually used only for military and aerospace applications. Available up to 84 pins.

Memory device A Device that contains an array of storage locations. The device has a set of inputs, called address, which specify which location in the array is being accessed. A set of input/output pins produce the stored number (pattern) when the device is read, and accept a new value when the device is written or programmed. Additionally, there are one or more input pins that select the operating move (read, write, standby, etc.). Memory devices may be classified by whether they are volatile or nonvolatile, and whether they may be erased. The memory's organization refers to its word width and the number of words in the device.

Microcontroller A device that contains a central processing unit (CPU), memory, and I/O ports on a single IC. Microcontrollers that contain any form of nonvolatile memory may be programmed on a device programmer. When connected to a power supply and external crystal, many of these devices form a complete microcomputer.

Non-Volatile The Characteristic of a memory that does not lose its contents when its power is removed. Non-volatile memory is useful in microcomputer circuits because it can provide instructions for a CPU as soon as the power is applied, before secondary devices, such as disk, can be accessed. Non-Volatile memory includes ROM, EPROM and EEPROM.

Oscillator A device that produces an alternating output current.

OTP One-time programmable. The characteristic of a memory device that can be programmed once but cannot be erased. When an EPROM is described as OTP, this means that its die is erasable when exposed to ultraviolet light, but because of its package, which is not transparent, it cannot be exposed to light and thus it cannot be erased.

Package The plastic or ceramic that protects an IC die and connects it to the target circuit.

Parallel printer port A standard port on virtually every PC designed for connection to a printer. This port has eight data lines and several control lines. Parallel ports may be either unidirectional or bidirectional. If your computer has a unidirectional port, the programmer will use the status lines to read data back from the programmer. The port allows high-speed communication (many times faster than a serial port). There may be up to three parallel ports in most PCs designated LPT1, LPT2, and LPT3.

PGA Pin Grid Array. A square, through-hold IC package that has pins located on a square grid with 0.1000-inch pitch. It may have up to several hundred pins. Used primarily for military and prototype designs.

PLCC Plastic Leaded Chip Carrier, A square plastic package that has J-shaped leads on four sides. This can be surface mounted or placed in a socket for through-hole use. Available in 20 to 84 pins.

PLD Compiler A software package that allows an engineer to specify the functionality of a PLD through a high-level language or schematic diagram. The software will convert the design into a JEDEC or other file for the PLD programmer. PLD compilers are available from numerous IC manufacturers and from third parties. The packages from IC manufacturers support only one brand of device and may be free, inexpensive or expensive. The most popular compiler is PALASM (prices under $200, available from AMD sales offices and representatives) which supports most of AMD's line of PMDs with an easy-to-learn high-level language. The compiler that probably offers the highest level of functionality and flexibility is PLDesigner made by MINC. It supports most PLDs and offers a sophisticated input language with full support for state machines and other complex constructs, partitioning designs into several PLDs, and graphical input. Their tools run on PCs and workstations. PLD compilers have simulators that can be used to test the functionality of your design and validate test vectors that you design before programming a device.

PQFP Plastic Quad Flat Pack. See QFP.

QFP Quad Flat Pack. A square IC package that has surface-mount leads coming from four sides. It is used for high-density applications, usually over 100 pins. Lead pitch may be 0.025 inches or smaller.

RAM Random Access Memory. A volatile memory device.

ROM Read Only Memory. A non-volatile memory device that cannot be programmed by the user. It is programmed at the factory through the use of a mask pattern in the final fabrication steps of the die.

Serial Memory An EPROM or EEPROM that is accessed by shifting in addresses and shifting out data one bit at a time. Interfaces are available using one, two or three wires for clock, data in, and data out.

Socket module An interchangeable metal chassis that contains a programming socket.

SOIC Small Outline Integrated Circuit. A surface-mount IC package that has two rows of leads on opposite sides. Commonly found in 8 to 32 pin sizes. Leads are usually 0.050 pitch.

Test vector A set of characters that describe the inputs and outputs of a device during a functional test. There is one character in the vector for each pin on the device. Numbers represent inputs to be applied to the device (1 for Vih, 0 for Vil). Letters represent the outputs that must be tested (H for Voh, L for Vol, Z for high-impedance). During the test, the part will be powered up and each input will be applied to the device for the first vector. Then, each output will be applied to the device for the first vector. This process will continue for each vector and any errors will be reported.

TQFP Thin Quad Flat Pack. Similar to QFP but with a lower profile and physically smaller in length and width.

TSOP Thin Small Outline Package. A surface-mount package with fine-pitch leads (usually 0.025 inch pitch) on two sides. This package is very low profile and commonly available in a reverse (mirror image) pinout used to simplify circuit board layout. Usually 32 to 44 pins.

UV Erasable The characteristic of an EPROM that allows it to be erased with exposure to short –wave ultra-violet light. This high-energy light can discharge the floating-gate transistor cells that store bits in an EPROM. The most common source of such light is a mercury vapor tube much like an ordinary fluorescent tube, but without the phosphor that turns the UV light emitted by the mercury into visible light. The light from ordinary fluorescent lamps or sunlight generally takes years to erase an EPROM. All UV erasable parts have a quartz windowed ceramic package that allows exposure with UV light.

Verify Reading a programmable device and comparing its contents to the desired pattern for that device. This is a go/no-go test – it does not report what the discrepancies are. See also: compare.

Word width The number of output pins that a memory device has. The most common size for EPROMs is byte wide (8 bits) and "word" wide, or 16 bits. It can also refer to the aggregate width of several memory devices used in a set.

EPROM ERASERS

MODEL	1. ET240AT-110	2. ET140AT-110	3. LA6T-110	4. DATAII-ACT
Dimension(")	8 x 3 x 3	13 x 5 x 3	7 x 3 x 2.5	6 x 2 x 1
Tray Size(")	6 x 4	3 x 2	3 x 2	3 x 2.5
Case	Aluminum	Aluminum	Plastic	Plastic
# of UV Tube	**2**	**1**	**1**	**1**
# of EPROM	**28**	**16**	**9**	**4**
micro Watts/cm²	**15000**	**9600**	**7000**	**4500**
TIMER	60 min	60 min	40 min	8 min
FOREIGN	ET240AT-220	ET140AT-220	LA6T-220	N/A

TopMax Device List 3.1V

Additional Devices are being added continuously. Visit www.eetools.com !

ALI
M6759

ALLIANCE
AS29F04
AS29LV800B
AS29LV800T

ALTERA
EPC1213(DIP)
EPC1213(PLCC)
EPC1064(DIP)
EPC1064(PLCC)
EPM3032A(44)
EPM7032(44)..
EPM7032V(44).. ..T-44P
EPM7032S
EPM7064(44).....T-44P
EPM7064(68).....P08
EPM7064(68).....P57
EPM7064(84).....P13
EPM7064(84).....P58
EPM7064s(44).....T-44P
EPM7064AE(44)..T-44P
EPM7064S(68) P57
EPM7064S(84) P58
EPM7096(68).....P57
EPM7096(68).....P09
EPM7096(84).....P14
EPM7096(84).....P58
EPM7128E
EPM7128S(84) 059
EP1800LC P31
EP1810JC.....P31
EP1830JC.....P31
EPC1
EPC2
EP22V10
EP22V10E
EP220
EP310
EP312
EP320
EP330
EP600
EP600I
EP610(DIP)
EP610(PLCC) P40
EP610I(DIP)
EP610I(PLCC) P40
EP630
EP900
EP900PLCC.....P02
EP900I
EP910
EP910PLCC.....P02
EP910I
EP910IPLCC.....P02

AMD
Am27S12
Am27S12A
Am27S13
Am27S13A
Am27S185
Am27S185A
Am27S18
Am27S18A
Am27S19
Am27S19A
Am27S191
Am27S191A
Am27S20
Am27S20A
Am27S21
Am27S21A
AM27S23
Am27S25
Am27S25A
Am27S28
Am27S28A
Am27S29
Am27S29A
Am27S291
Am27S291A
Am27S32
Am27S32A
Am27S33
Am27S35
Am27S35A
Am27S37
Am27S37A
Am27S43
Am27S43A
Am27S45
Am27S45A
Am27S47
Am27S47A
Am27S51
Am27S51A
Am1736
Am1765
Am27128
Am27128A
Am2716
Am2716B
Am27256
Am2732
Am2732A
Am2732B
Am27512
Am2764
Am2764A
Am27C010
Am27C020
Am27C040
Am27C128
Am27C256
Am27C512
Am27C64
Am27H010
Am27H256
Am27HB010
Am27C1024
Am27C2048
AM27C4096
AM27LV010B
Am2817A
Am2864A
Am2864AE
Am2864B
Am2864BE
Am28F010
Am28F020
Am28F256
Am28F512
Am29DL162CB/CT
Am29DL163CB/CT
AM29DL164DB/DT
Am29DL316CB/CT
Am29DL322CB/CT
Am29DL323CB/CT
Am29DL323DB/DT
Am29DL324DB/DT
AM29DL400BB
AM29DL400BT
AM29DL800BB
AM29DL800BT
Am29SL160CB/CT
AM29SL160BB/BT
AM29F004BB/BT
Am29F010
Am29F040
AM29F040B
AM29F080
AM29F016(T48) T-48T
AM29F016B(T48) T-48T
AM29F017B
AM29F017D
AM29LV001BB/BT
M29LV002T(T40) T-48T
AM29LV002T(S44) T-44S
AM29F002BB
AM29F002BT
AM29F002NBB
AM29F002NBT
AM29LV004T(T40) T-48T
AM29LV004T(S44) T-44S
AM29LV008T(T40) T-48T
AM29LV008T(S44) T-44S
AM29LV008BB
AM29LV008BT
AM29LV017D
AM29LV116DB
AM29LV116DT
AM29LV033C
AM29LV040B
AM29LV081
AM29LV081B
AM29LV065D
AM29LV116BB
AM29LV116BT
AM29LV320DB
AM29LV320DT
AM29LV641
AM29F010A/B
AM29F080(T40) T-48T
AM29F080(S44) T-44S
AM29F080B(T40) T-48T
AM29F080B(S44) T-44S
AM29F100B(T48) T-48T
AM29F100B(S44) T-44S
AM29F100B(T40) CIC40
AM29F100T(T48) T-48T
AM29F100T(S44) T-44S
AM29F100T(T40) CIC40
AM29F200B(T48) T-48T
AM29F200B(S44) T-44S
AM29F200B(T40) CIC40
AM29F200BB
AM29F200BT
AM29F200T(T48) T-48T
AM29F200T(S44) T-44S
AM29F200T(T40) CIC40
AM29F200AB(T48) T-48T
AM29F200AB(S44) T-44S
AM29F200AB(T40) CIC40
AM29F200AT(T48) T-48T
AM29F200AT(S44) T-44S
AM29F200AT(T40) CIC40
AM29LV200B(T48) T-48T
AM29LV200B(S44) T-44S
AM29LV200B(T40) CIC40
AM29LV200BB
AM29LV200BT
AM29LV200T(T48) T-48T
AM29LV200T(S44) T-44S
AM29LV200T(T40) CIC40
AM29F400B(T48) T-48T
AM29F400B(S44) T-44S
AM29F400B(T40) CIC40
AM29F400T(T48) T-48T
AM29F400T(S44) T-44S
AM29F400T(T40) CIC40
AM29F400AB(T48) T-48T
AM29F400AB(S44) T-44S
AM29F400AB(T40) CIC40
AM29F400AT(T48) T-48T
AM29F400AT(S44) T-44S
AM29F400AT(T40) CIC40
AM29F400BB(T48) T-48T
AM29F400BB(S44) T-44S
AM29F400BB(T40) CIC40
AM29F400BT(T48) T-48T
AM29F400BT(S44) T-44S
AM29F400BT(T40) CIC40
AM29F400B(T48) T-48T
AM29F400B(S44) T-44S
AM29F400B(T40) CIC40
AM29F400T(T48) T-48T
AM29F400T(S44) T-44S
AM29F400T(T40) CIC40
AM29F800B(T48) T-48T
AM29F800B(S44) T-44S
AM29F800B(T40) CIC40
AM29F800BB
AM29F800BT
AM29F800T(T48) T-48T
AM29F800T(S44) T-44S
AM29F800T(T40) CIC40
AM29F800AB(T48) T-48T
AM29F800AB(S44) T-44S
AM29F800AB(T40) CIC40
AM29LV008BB
AM29LV008BT
AM29F800AT(T48) T-48T
AM29F800AT(S44) T-44S
AM29F800AT(T40) CIC40
AM29LV800B(T48) T-48T
AM29LV800B(S44) T-44S
AM29LV800B(T40) CIC40
AM29LV800T(T48) T-48T
AM29LV800T(S44) T-44S
AM29LV800T(T40) CIC40
AM29LV800BB(T48)
AM29LV800BT(T48)
AM29LV160BB(T48)
AM29LV160BT
AM29LV160Bx
AM29LV160DB/T
AM29F032B
AM29LV10B
AM29F002T
AM29F002NT
AM29F002NB
AM29PL160CB/T
AmPAL16H8
AmPAL16H8L
AmPAL16H8Q
AmPAL16HD8
AmPAL16L8
AmPAL16LD8
AmPAL16R4
AmPAL16R6
AmPAL16R8
AmPAL20L10-20
AmPAL20L10A
AmPAL20L10B
PAL16L8-4
PAL16R4-4
PAL16R4D/2
PAL16R6-4
PAL16R6D/2
PAL16R8-5
PAL16R8D/2
PAL16L8-7
PAL16R4-7
PAL16R6-7
PAL16R8-7
PAL16L8H-10
PAL16R4H-10
PAL16R6H-10
PAL16R8H-10
PAL16R8-4
PAL20L8-7
PAL20R4-7
PAL20R6-7
PAL20R8-7
PAL20L8-5
PAL20R4-5
PAL20R6-5
PAL20L8-10
PAL20R4-10
PAL20R6-10
PAL20R8-10
PALCE16V8
PALCE16V8H
PALCE16V8Q
PALCE16V8Z
PALCE20V8H-25.
PALCE20V8Q-25.
PALCE20V8H-10/4
PALCE20V8Q-15/4
PALCE20V8Q-25/4
PALCE20V8
PALCE20RA10
PALCE20RA10H
PALCE20RA10HQ
PALCE26V12H/4
PALCE26V12
MACH110 .....P17
MACH111 .....P17
MACH111-SP P17
MACH120 .....P20
MACH210 .....P17
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MACH211 .....P17
MACH211-SP P17
MACH215 .....P17
MACH220 .....P20
MACH230 .....P18
MACH231 .....P18
MACH130 .....P18
MACH435 .....P19
MACH436
MACHLV436
PALC16L8Z
PALC16R4Z
PALC16R6Z
PALC16R8Z
PALLV16V8
PALLV16V8Z
PALLV22V10
AmPAL22V10
AmPAL22V10A
AmPALCE22V10H
AmPALCE22V10Q
AmPALCE22V10Z
AmPAL LV22V10Z
AmPALCE26V12H
AmPALCE610H
87C51
8751H
8753H
87C521T2
87C521
87C541

AMD(MMI)
PAL10H8
PAL10L8
PAL12H6
PAL12L10
PAL12L6
PAL14H4
PAL14L4
PAL14L8
PAL16C1
PAL16H2
PAL16L2
PAL16L6
PAL16L8
PAL16L8A
PAL16L8B
PAL16L8D
PAL16L8H-15
PAL16R4
PAL16R4A
PAL16R4B
PAL16R4D
PAL16R4H-15
PAL16R6
PAL16R6A
PAL16R6B
PAL16R6D
PAL16R6H-15
PAL16R8
PAL16R8A
PAL16R8B
PAL16R8D
PAL16R8H-15
PAL16X4
PAL18L4
PAL20C1
PAL20L10
PAL20L2
PAL20L8A
PAL20L8B
PAL20R4A
PAL20R4B
PAL20R6A
PAL20R6B
PAL20R8A
PAL20R8B
PAL20X10
PAL20X4
PAL20X8
PALC16L8Q
PALC16R4Q
PALC16R6Q
PALC16R8Q
PALC22V10H

AMIC
A29001U
A29001T
A290011U
A290011T
A29002U
A29002T
A290021U
A290021T
A29002U
A29002T
A290021U
A290021T
A29010
A29040
A29040A
A29400U
A29800U
A29800T

ATMEL
AT27HC641R
AT27HC642R
AT24C01
AT24C01A
AT24C02
AT24C02A
AT24C04
AT24C04A
AT24C08
AT24C08A
AT24C21
AT24CCS128
AT24CS256
AT24C16
AT24C32
AT24C64
AT24C512
AT25HP256
AT25HP512
AT25F1024
AT26256
AT27C128
AT27C256
AT27C2048
AT27C520
AT27LV256R
AT27LV520
AT27C256R
AT27C512
AT27C512R
AT27LV512A
AT27LV512R
AT27C513
AT27C513R
AT27C516
AT27C010
AT27C400
AT27C800
AT27LV010
AT27LV010A
AT27LV010L
AT27C010L
AT27C011
AT27C020
AT27C1024
AT27C1024L
AT27HC1024
AT27C4096
AT27LV020
AT27LV020A
AT27C040
AT27LV040
AT27LV040A
AT27C080
AT27LV080
AT27LV1024
AT27LV4096
AT27HC64
AT27HC256
AT27LV256A
AT27BV256
AT27BV512
AT27BV010
AT27BV020
AT27BV040
AT27BV1024
AT27BV4096
AT28BV16
AT28BV64
AT28C16
AT28C17
AT28C64
AT28LV64
AT28C256
AT28C1024
AT27HC256
AT27RW1024
AT28HC16
AT28HC16L
AT28HC256E
AT28HC256F
AT28HC256L
AT28HC256LE
AT28HC64
AT28HC64B
AT28HC64E
AT28HC64L
AT28HC64LE
AT28C010
AT28C040
AT28LV64B
AT28LV256
AT28MC010
AT28MC040
AT28PC64
AT28PC64E
AT32C16
AT59C11
AT93C46
AT93C56
AT93C57
AT93C66
AT29C256
AT29C257
AT29C512
AT29C1024
AT29C010
AT29C010A
AT29LV010A
AT29LV020
AT29BV010A
AT29C020

AT29C040
AT29C040A
AT29LV040A
AT29LV1024
AT17C65
AT17C65A
AT17C128
AT17C128A
AT17C256
AT17C256A
AT17C512
AT17C512A
AT17C010
AT17C010A
AT17LV002
AT17LV002A
AT17LV65A
AT17LV128A
AT17LV256A
AT17LV512A
AT17LV010A
AT49BV001
AT49BV001N
AT49BV001T
AT49BV001NT
AT49BV002
AT49BV002N
AT49BV002T
AT49BV002NT
AT49BV040T
AT49BV080T
AT49BV512
AT49BV160
AT49BV160T
AT49BV161
AT49BV161T
AT49BV1604/T
AT49BV1604A
AT49BV1604AT
AT49BV1614/T
AT49BV1614A
AT49BV1614AT
AT49BV1618/T
AT49BV320
AT49BV320T
AT49BV4096A/AT
AT49BV8192A/AT
AT29F001
AT29F001N
AT29F002
AT29F002N
AT45D011
AT45D021
AT45D041
AT45DB011
AT45DB021
AT45DB021B
AT45DB041
AT45DB041B
AT45DB081
AT45DB081B
AT45DB011B
AT45DB161
AT45DB161B
AT45DB321
AT49BV008AT
AT49F010
AT49F020
AT49F040
AT49F040T
AT49F1024 TSOP40
AT49F1025
AT49F1604/T
AT49F1614/T
AT49F4096A/AT
AT49F512
AT29LV001
AT29LV001N
AT29LV001T
AT29LV001NT
AT29LV002
AT29LV002N
AT29LV002T
AT29LV002NT
AT49BV321
AT49BV321T
AT49BV2048A
AT49BV8004
AT49BV800AT
AT49BV8011
AT49BV8011T
AT49LW040
AT49LW080
AT49F8004
AT49F800AT
AT49F8011
AT49F8011T
AT49F1618
AT49LV1025 plcc44
AT49LV010
AT49LV020
AT49LV040
AT49LV040T
AT49LV080
AT49LV080T
AT49LV1614A
AT49LV1614AT
AT49LV2048
AT59C22
AT59C13
AT22V10
AT22V10B
AT22V10L
AT22LV10L
ATF16V8B
ATF16V8C
ATF16V8CZ
ATF16V8L
ATF20V8L
ATF22V10B
ATF22V10C
ATF22V10CZ
ATF22V10L
ATF22LV10C
ATF22LV10CZ
ATV750
ATV750B/L
ATV750LVC
ATV750LVCL
ATV750 LVCEXT
ATF1500
ATF1502
ATF1502AS/L
ATF1502ASV/L
ATF1504
ATF1508
ATV2500/H/L
ATV2500B/BQ
ATV2500(44P) T-44P
ATV2500H(44P) T-44P
ATV2500L(44P) T-44P
ATV2500B(44P) T-44P
ATV2500BQ(44P) T-44P
ATF16V8B/L
ATF20V8B/L
AT87F51
AT87F51RC
AT87F52
AT87F55
AT87F55WD
AT89C51
AT89C51RC
AT89C51-5
AT89C52
AT89C52-5
AT89C55
AT89C1051
AT89C1051U
AT89C2051
AT89S51
AT89S52
AT89S53
AT89S8252
AT89LS8252
AT89LV51
AT89LV52
AT89C1051
AT89C2051
AT89C4051
AT90S1200
AT90S2313
AT90S2323
AT90S2343
AT90S2333
AT90S4434
AT90LS2333
AT90LS4434
AT90S4415
AT90S4434
AT90S8515
AT90S8535
AT90S1200
AT90LS2323
AT90LS2343
AT90LS4434
AT90LS8535
Atmega161
Atmega161L
Atmega163
Atmega163L
Attiny10/L
Attiny11/L
Attiny12/L
Attiny15L
Attiny28L
Attiny28L QFP32
Attiny28V
Attiny28V QFP32

BRIGHT

BR29F040
BR29F400B
BR29F400T

CATALYST

CAT24C02
CAT24C04
CAT24C08
CAT24C16
CAT24WC01
CAT24WC02
CAT24WC04
CAT24WC08
CAT24WC16
CAT2502
CAT2504
CAT2508
CAT2516
CAT2532
CAT2564
CAT25128
CAT25256
CAT27010
CAT27128A
CAT27256
CAT27512
CAT2764A
CAT27HC256
CAT28C16A
CAT28C17A
CAT28C256
CAT28C64A
CAT28C64B
CAT28C65A
CAT28F010
CAT28F020
CAT33C101
CAT33C104
CAT33C116
CAT33C116I
CAT33C204
CAT35C102
CAT35C104
CAT35C116
CAT35C116I
CAT35C202
CAT35C204
CAT59C11
CAT93C46
CAT93C46A
CAT93C56
CAT93C86
CAT27C210

CYPRESS

CY7C235
CY7C245
CY7C245A
CY7C265
CY7C266
CY7C268
CY7C269
CY7C271
CY7C274
CY7C279
CY7C281
CY7C282
CY7C263
CY7C264
CY7C285
CY7C261
CY7C263
CY7C264
CY7C276 ..... T-44P
CY7C286
CY7C287
CY7C289
CY7C291
CY7C291A
CY7C292
CY7C292A
CY7C293A
CY27C256
CY27C512
CY27C010
CY27C020
CY27C040
CY7C330
CY7C331
CY7C332
CY7C63000A
CY7C63001A
CY7C63100A
CY7C63101A
PAL22V10
PAL22V10C
PAL22VP10C
PALC22V10B
PALC22V10D
PALC16L8
PALC16R4
PALC16R6
PALC16R8
PLDC20G10
PLDC20G10B
PLDC20G10C
PLDC20RA10
PALCE16V8
PALCE22V10

DALLAS

DS1220AB
DS1220AD
DS1220Y
DS1225AB
DS1225AD
DS1225Y
DS1230AB
DS1230Y
DS1235AB
DS1235Y
DS1235YW
DS1243
DS1243Y
DS1244Y
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DS1658Y
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DS87C530 ..... T-44P
DS89C420

DENSE PAC

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DPV27C256
DPV27C512

ELECTRONIC

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EON

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EN29F002NT

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FAIRCHILD

NM93C46
ACD1101
ACD1202

FUJITSU

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PEEL20CG10
PEEL22CV10
PEEL253
PEEL273

GREENWICH

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GR2764
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GR12883
GR3281
GR281
GR881

HITACHI

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HN27C256HG
HN27C512AG
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HN27C301P
HN27C4001G
HN27C64G
HN28F101
HN462532G
HN462716
HN462716G
HN462732G
HN48016P
HN4827128G
HN4827128P
HN482732AG
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HN482764P
HN58064
HN58C256P
HN58C65P
HN27C1024HG
HN27C4096G
HD64F2238ABP
H8/3332 ..... P36
H8/337 ..... P37
H8/532 ..... P38
H8/536 ..... P39

HYUNDAI

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HY29F400BT
HY29F800TB

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HYNIXI

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IS89C64

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PEEL20CG10
PEEL20CG10A
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PEEL22CV10A
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27CX641
27CX642

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IM29F001T
IM29F002T

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28F004B5-T
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28F008B3T
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28F800C3B/C3T
28F160F3B/F3T
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GAL22V10
GAL22V10B
GAL22V10C
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GAL22LV10D
GAL22LV10Z
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GAL20XV10
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GAL6001B
GAL20RA10
GAL20XV10B
GAL20RA10B
GAL18V10
GAL18V10B
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L.G. SEMI

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LINVEX

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MACRONIX

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MICROCHIP

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PIC16C64/A
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24LC256

MICRON

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MT28F400T(S44) T-44S
MT28F016S3

MITSUBISHI

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MOSEL-VITELIC

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MOSTEK

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MC68HC705D9-FN T-44P
MC68HC705D9-P
MC68HC705D32A-P
MC68HC705D32A-FNT
MC68HC705J1A
MC68HC705J2-P
MC68HC705B5-FN B52
MC68HC705B16N
MC68HC705B16-FNB52
MC68HC705B32-FN B52
MC68HC705JJ7
MC68HC705JP7
MC68HC705KJ1
MC68HC705MC4
MC68HC705SR3
MC68HC811E2-P
MC68HC705P6
MC68HC705P6A-P
MC68HC705P9-P
MC68HC805P18-P P62
MC68HC805P18-DW P64
MC68HC705X32-FU P63
MC68HC705X4-DW P64
MC68HC705X16-FU P63
(All DIP packages work w/o adapters)

NATIONAL

74LS471
74S287
74S287A
74S288
74S387
74S387A
74S472
74S472A
74S472B
74S473
74S473A
74S474
74S570
74S570A
74S571
74S571A
74S571B
74S572
74S572A
74S573
74S573A
74S573B
87S181
87S181A
87S185
87S185A
87S185B
87S191
87S191A
87S191B
MM2716
MM2716E
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NM24C08
NM24C16
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NM27C020
NM27C040
NM27C128
NM27C240
NM27C512
NM27C64
NMC2732
NMC27C010
NMC27C020
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NMC27C128BN
NMC27C128BQ
NMC27C128C
NMC27C128CQ
NMC27C16
NMC27C16BQ
NMC27C16H
NMC27C16HQ
NMC27C16Q
NMC27C256
NMC27C256B
NMC27C256BN
NMC27C256C
NMC27C32
NMC27C32Q
NMC27C32B
NMC27C32E
NMC27C32EH
NMC27C32H
NMC27C512
NMC27C512A
NMC27C512AN
NMC27C64
NMC27C64B
NMC27C64BN
NMC27C64N
NMC27CP128
NMC9306
NMC9307
NMC9313B
NMC9314B
NMC9346
NMC93C06
NMC93C14
NMC93C46
NMC93C56
NMC93C66
NMC93C86
NMC93CS06
NMC93CS46
NMC93CS56
NMC93CS66
NMC27C1024
NMC27C2048
GAL16V8
GAL16V8A
GAL20V8
GAL20V8A
GAL20RA10
GAL22V10
GAL22CV10
GAL6001
PAL10H8
PAL10H8A
PAL10H8A2
PAL10L8
PAL10L8A
PAL10L8A2
PAL12H6
PAL12H6A
PAL12H6A2
PAL12L6
PAL12L6A
PAL12L6A2
PAL14H4
PAL14H4A
PAL14H4A2
PAL14L4
PAL14L4A
PAL14L4A2
PAL16H2
PAL16H2A
PAL16H2A2
PAL16L2
PAL16L2A
PAL16L2A2
PAL16C1
PAL16C1A
PAL16C1A2
PAL16L8
PAL16L8A
PAL16L8A2
PAL16L8B
PAL16L8B2
PAL16R4
PAL16R4A
PAL16R4A2
PAL16R4B
PAL16R4B2
PAL16R6
PAL16R6A
PAL16R6A2
PAL16R6B
PAL16R6B2
PAL16R8
PAL16R8A
PAL16R8A2
PAL16R8B
PAL16R8B2
PAL12L10
PAL12L10A
PAL14L8
PAL14L8A
PAL16L6
PAL16L6A
PAL18L4
PAL18L4A
PAL20L2
PAL20L2A
PAL20C1
PAL20C1A
PAL20L10
PAL20L10A
PAL20X4
PAL20X4A
PAL20X8
PAL20X8A
PAL20X10
PAL20X10A
PAL20L8
PAL20L8A
PAL20L8B
PAL20R4
PAL20R4A
PAL20R4B
PAL20R6
PAL20R6A
PAL20R6B
PAL20R8
PAL20R8A
PAL20R8B
COP822 ..... CA
COP842 ..... CA
COP8642 ..... CA
COP820 ..... CA
COP8640 ..... CA
COP881 ..... CA
COP884 ..... CA
COP880 ..... CA
COP888 ..... CA
COP943 ..... CA
COP8742 ..... CA
COP8781 ..... CA
COP8780 ..... CA
COP8SAA716
COP8SAA720
COP8SAA728
COP8SAB720
COP8SAB728
COP8SAC720
COP8SAC728
COP8SAC740
COP8SAC744
COP8SGE720
COP8SGE728
COP8SGE740
COP8SGE744
COP8SGR720
COP8SGR728
COP8SGR740
COP8SGR744

NEC

uPD27128
uPD2716
uPD27256
uPD2732
uPD2732A
Uod27hc65
uPD2764
uPD27C1000
uPD27C1000A
uPD27C1001A
uPD27C1001D
uPD27C2001
uPD27C256
uPD27C256A
uPD27C4001
uPd27C8000
uPD27C8001
uPD27C512
uPD27C64
uPD28C64
uPD28C64C
uPD27C1024
uPD27C1024A
uPD27C4096
78P054
8749H

NEXFLASH

NX29F010

OKI

MR27V1652D
MR27V6466F
MSM271000AS
MSM271000ZB
MSM27128A
MSM27128AS
MSM27128AZB-RS
MSM2716
MSM27256
MSM27256AS
MSM27256ZB-RS
MSM2732
MSM2732A
MSM27C402ZB
MSM27C402CZ
MSM27512
MSM27512AS
MSM27512ZB-RS
MSM2764
MSM2764A
MSM2764AS
MSM2764AZB-RS
MSM2764RS
MSM27C128AS
MSM27C2000
MSM27C256
MSM27C256H
MSM27C256HZB
MSM27C256ZB
MSM27C64AS
MSM2816ARS
MSM271000
MSM271024
MSM271024AS
MSM271024ZB
MSM27C1024
MSM27C1024AS
MSM27C2048
MSM27C1652CZ
MSM27C402ZB
MR27V1602
MR27V1652
MR27V3202E
MR27V3202F
MR27V6402G

PHILIPS

(Signetics)
82S123
82S123A
82S126
82S126A
82S129
82S129A
82S130
82S130A
82S131
82S131A
82S135
82S137
82S137A
82S137B
82S140
82S141
82S147
82S147A
82LS181
82S181
82S181A
82S181B
82S181C
82S185
82S185A
82S185B
82S191
82S191A
82S191B
82S191C
82S23
27C010
27C256
27C512
27C64A
27C210
27C240
8582C
8582D
8582E
8592
PL22V10
PXAG37
LVT22V10
ABT22V10
PLC18V8Z
PLS100
PLS101
PLS152
PLS153
PLS153A
PLS155
PLS157
PLS159
PLS159A
PLS173
PLUS16L8D/-7
PLUS16L8-7
PLUS16R4D /-7
PLUS16R4-7
PLUS16R6D /-7
PLUS16R6-7
PLUS16R8D/-7
PLUS16R8-7
PLUS173B
PLUS173D
PLUS20L8D/-7
PLUS20L8-7
PLUS20R4D/-7
PLUS20R4-7
PLUS20R6D/-7
PLUS20R6-7
PLUS20R8D/-7
PLUS20R8-7
P3Z22V10
P5Z22V10
87C52
87C51
87C51FA
87C51FB
87C51FC
87C51GB P64
87C451 ..... P22
87C451PLCC P23
87C550 ..... P24
87C550PLCC P25
87C552 ..... P26
87C592 ..... P27
87C528
87C575
87C576
87C654 ..... P41
87C652 ..... P41
87C524
P87C591
P87C749
87C750
87C751
87C752
P85C764
P87C51FA
P87C51FB
P87C51FC
P87C51MA2
P87C51MB2
P87C51MC2
P87C51RA+
P87C51RB+
P87C51RC+
P87C51RD+
P87C51XAG37
P87C51XAS37
P87C52
P87C54
P87C58

P87C764
P87LPC761
P87LPC762
P89C51U
P89C54
P89C536
P89C538
P89C738
P89C52
P89C54
P89C58
P89C51B
P89C52B
P89C54B
P89C58B
P89C51RB2
P89C51RC2
P89C51RD2
P89C51RA+
P89C51RB+
P89C51RC+
P89C51RD+
P89C51X2
P89C52X2
P89C54X2
P89C58X2
P89C51XA-G49
P89C660
P89C662
P89C664
P89C668
PCD3855A
PCF8594
PCF8598
PXAC37

PMC

PM29F002T
PM29F002B
PM29F004T
PM29LV104RB
PM29LV104RT
PM39LV512R

QUICK PULSE

27010
27011
27040
27128A
27256
27512
2764A
27210

RICOH

BR93C46
RD27C256
RD27C64

ROCKWELL

R2764
R2764C
R2764P
R27C64
R2816

ROHM

BR24C01A
BR24C02A
BR24C04
BR24C04A
BR24C08A
BR24C16A
BR24E16
BR9010
BR9020
BR9040
BR9080
BR9016
BR93LC46/F
BR93LC56/F
BR93LC66 /F
BR93LL46/F

RUSSIAN

573RF2/5
57RF4-21
57RF4-21.5
573RF4-23
556RT6
556RT7
556RT12
556RT13
556RT14
556RT15

SAMSUNG

K8D3216UBM
K8D3216UTM
K8D3316UBM
K8D3316UTM
K5A3240YB
K5A3240YT
K5A3280YB
K5A3280YT
K5A3340YB
K5A3340YT
K5A3380YB
K5A3380YT
K5F3264YBM
K5F3264YTM
K5U64418TM
K5U64818TM
K5U64158TM
K8D1616UBA
K8D1616UTA
K9K1208U(MD2)
K9K1208U(MD2+SP)
KAB01D100M
KAB01C100M
KM2816A
KM2816AI
KM2817A
KM2817AI
KM2864A
KM2864AH
KM2865A
KM2865AH
KM28C16
KM28C17
KM28C256
KM28C64A
KM28C65A
KM28DU160B/T
KM28U800-B
KM28U800-T
KM28U160
KM29W040
KM29W8000
KM29W1600
KM29W3200
KM29W6400
KM29W32000
KM5MU1620
KM93C06
KM93C07
KM93C46
KM93C56
KM93C66
KM29C010
KM29U128T
KM29U256T
KM5MU0820
KM5AU1620-B
KM5AU1620-T
KM5AU1621-B
KM5AU1621-T
KS24C010
KS24C011
KS24C020
KS24C021
KS24C040
KS24C041
KS24C080
KS24C081
KS24L161
KS24L321
KS24L641
KS88P0416
KS88P0424
KS57P0616 QFP44
KS57P3204 QFP64
KS57P21208 QFP44
KS57P4104 QFP44
KS57P4303 QFP44
KS57P5208 QFP44
KS86P6008 QFP44
KS88P6116 QFP44
KS86P6008 QFP44
KS86P6408 QFP44
KS86P0004 QFP44
KS57P0408 QFP44
KS57P2304 QFP64
KS88P0716 QFP64
KS57P2308 QFP80
KS57P2316 QFP80
KS57P2916 QFP80
KS57P21408 QFP100
KS57P21632 QFP100
KS88P2148 QFP80
KS88P2416 QFP80
KS88P2432 QFP80
KS88P4304 DIP20
KS88P4504 QFP80
KS88P4632 QFP64
KS88P463 SDIP68
KS88P4716 QFP44
KS88P4716 SDIP42
KS88P8324 SDIP42
KS88P8432 SDIP42
KS57P21208 SDIP42
KS57P21516 QFP100
KS57P21708 QFP64
KS57P21832 QFP100
KS57P5616 QFP100
KS57P5404 SDIP24
KS57P0504 SDIP30
KS57P4204 SDIP30
KS57P4304 SDIP42
KS57P5308 SDIP30
KS57P5312 SDIP30
KS86F4404
KS86F4504
KS86P4004 SDIP30
KS86P4208 SDIP30
KS86P6104 DIP20
KS57P0616 SDIP42
KS57P4104 SDIP42
KS57P5208 SDIP42
KS88P6232 SDIP42
KS57P5116 SDIP68
KS57P5532 SDIP68
KS88P0716 SDIP68
KS57P5404 SOP24
KS86P4104 SOP24
KS86P6104 SOP24
KS57P0504 SOP32
KS57P5308 SOP32
KS57P5312 SOP32
KS86P4004 SOP32
KM5AU1620-B
KM5AU1620-T
KM5AU1621-B
KM5AU1621-T
KM29U64000
MK29W040
MK29W8000
MK29W1600
MK29W3200
MK29W6400
CPL16L8
CPL16R4
CPL16R6
CPL16R8
CPL20L10
CPL20L8
CPL20R4
CPL20R6
CPL20R8
CPL22V10

SANYO

LE28F1101T
LE28FV1101T

SEEQ

27128
27256
2764
27C256
2804A
2816A
2816AH
2817A
2817AH
2864
2864H
28C010
28C256
28C256A
28HC64
28C64
28C64A
28C65
28C256AH
28HC256
28HC256H
5213
52B13
52B13H
52B33
52B33H
55B33
55B33H
E28C64
E52B13
E52B13H
E52B33
E52B33H
M28C64
M52B13
M52B13H
M52B33
M52B33H
M28C010
M28C010A

SEIKO

S24C01A
S24C02A
S24C04A

ST

ET2716
ETC2716
ETC2732
M24128
M24256
M24C01
M24C02
M24C04
M24C08
M24C16
M24C32
M24C64
M24LC21B
M25P05
M25P10
M27128A
M2716
M27256
M2732A
M27512
M2764
M2764A
M27C64A
M27C800
M27C800 ..... PLCC
M27C801
M27C160
M27C160 ..... PLCC
M27C320
M27C322
M27C1000
M27C1001
M27C1024
M27C2001
M27C256B
M27C4001
M27C4002
M27C405
M27C512
M27V101
M27V201
M27V322
M27V402
M27V160
M27V800
M27W101
M27W322
M27W401
M27W402
M27W512
M27W801
M28C64
M28F101
M28F201
M28F102
M28F256
M28F256A
M28F512
M28F410(S44) T-44S
M28F410(S44) T-44S
M28F410(S44) T-44S
M28F410(S44) T-44S
M28F800CB
M28F800CT
M28W160BB(T48)
M28W160BT(T48)
M28W160CB(T48)
M28W160CT(T48)
M28W320CB(T48)
M28W320CT(T48)
M29F002T
M29F002BB
M29F002BT
M29F002BNT
M29F010B
M29F100B(S44) T-44S
M29F100B(T48) T-48T
M29F100B(CIC) CIC-40
M29F100T(S44) T-44S
M29F100T(T48) T-48T
M29F100T(CIC) CIC-40
M29F102B
M29F102B TSOP40
M29F102BB
M29F200B(S44) T-44S
M29F200B(T48) T-48T
M29F200B(CIC) CIC-40
M29F200T(S44) T-44S
M29F200T(T48) T-48T
M29F200T(CIC) CIC-40
M29F400B(S44) T-44S
M29F400B(T48) T-48T
M29F400B(CIC) CIC-40
M29F400T(S44) T-44S
M29F400T(T48) T-48T
M29F400T(CIC) CIC-40
M29F800AB/AT
M29F160BB/BT
M29F040B
M29F016B
M29F016D
M29W004BB
M29W004BT
M29W022BB
M29W022BT
M29W512B
M29W010B
M29W017D
M29W102BB
M29W102BT
M29W040
M29W200BB
M29W200BT
M29W400B(S44) T-44S
M29W400B(T48) T-48T
M29W400B(CIC) CIC-40
M29W800DB
M29W800DT
M29E400BB
M29W400BT
M29W400T(S44) T-44S
M29W400T(T48) T-48T
M29W400T(CIC) CIC-40
M29W800B(S44) T-44S
M29W800B(T48) T-48T
M29W800B(CIC) CIC-40
M29W800T(S44) T-44S
M29W800T(T48) T-48T
M29W800T(CIC) CIC-40
M29W800AB
M29W800AT
M29W160DB
M29W160DT
M29W320DB
M29W320DT
M50FW020
M50FW040
M50FW080
M50LPW020
M50LPW040
M50LPW080
M87C257
M9306
M9346
M93C06
M93C46
M93C56
M93C66
M93C76
M93C86
M95010
M95020
M95040
M95010R
M95020R
M95040R
M95080
M95160
M95320
M95640
M95080R
M95160R
M95320R
M95640R
ST24C02/R
ST24W02
ST25C02
ST25W02
ST27128A
ST27256
ST2764A
ST27C256
ST93C46A /C/T
ST93C47C/T
ST93C56/C
ST93C57C
TS27C256
TS27C64
TS27C64A
TS28C16A
TS28C17A
TS28C64
ST62T01C
ST62E20
ST62E20B
ST62E25
ST62E25B
ST62E28C
ST62E30B
ST62E60
ST62E60B
ST62E65
ST62E65B
ST62T10
ST62T15
ST62T15C
ST62T20
ST62T20B
ST62T20C
ST62T25
ST62T25B
ST62T25C
ST62T28C
ST62T30B
ST62T40B
ST62T53C
ST62T55C
ST62T60
ST62T60B
ST62T60BB
ST62T63C
ST62T65
ST62T65B
ST62T00C
ST62T01C
ST62T03C
ST62T08C
ST62T09C
ST62T10C
ST62T20C
ST62T25C
ST65T65BB
ST86E60C
ST86E65C
ST86T60C
ST86T65C
MK48T02
MK48T08
MK48T12
MK48T18
MK48Z02
MK48Z08
MK48Z09
MK48Z12
MK48Z18
MK48Z19
M48Z128Y
M48Z129V/Y
M48Z256
GAL16V8
GAL16V8A
GAL20V8
GAL20V8A

SHARP

LH57128
LH57256
LH5764
LH28F008SAT
LH28F016SCT
LH28F008SC
LH28F008SCH
LH28F016SU
LH28F032SU
LH28F320
LH28F320BJE
LH28F320BJHE
LH28F400SU
LH28F800SU
LH28F800B
LH28F800BGHE
LH28F800BJE
LH28F800BVHE
LH28F800SGE
LH28F160B
LH28F160BJE
LH28F160S3
LH28F160S5NS
LH28F160SPN
LRS1316A
LRS1325A
LRS1329
LRS1336
LRS1349
LRS1350
LRS1360
LRS1370
LRS1386
LRS1805A
LRS1806A
LRS1825
LRS1826
LRS1815
LRS1816
LRS1306
LRS1337
LRS1342
LRS1381A
LRS1383
LRS1387

SIEMENS

SABC501-1E
SABC505A-4E
SABC504-2E
SDA2506

SMOS

SPM27128
SPM27128C
SPM27C256
SPM27C64
SPM27C64H
SPM2864C
SM8951
SM8952
SM8952
SM8958

SST

SST27SF256
SST27SF512
SST27SF010
SST27SF020
SST27VF010
SST29EE010/A
SST29LE010/A
SST29VE010/A
SST29VF010
SST29EE020/A
SST29LE020/A
SST29VE020/A
SST29VF020
SST29VF040
SST29EE512/A
SST29LE512/A

SST29VE512/A
SST29VF512
PH28EE011
SST28SF040
SST28SF040A
SST28VF040
SST28VF040A
SST28LF040A
SST28F040
PH29EE010
PH29EE020
PH29LE010
PH29LE020
PH29EE512
29SF010
29SF020
29SF040
29SF512
SST31LH021
SST31LH041
SST39LF512
SST39LF010
SST39LF020
SST39LF040
SST32VF802
SST32VF162
SST32VF164
SST32VF201
SST34HF3223A
SST34HF3243A
SST34VF1621
SST34VF1622
SST34VF1641
SST34VF1642
SST34VF1621
SST36VF1601
SST36VF1602
SST37VF010
SST37VF020
SST37VF040
SST37VF512
SST38UF166
SST38VF166
SST39LF100
SST39VF100
SST39LF200A
SST39LF400A
SST39LF800A
SST39LH010
SST39LH020
SST39LH040
SST39LH512
SST39SF512A
SST39SF010A
SST39SF020A
SST45VF010
SST32HF802
SST32HF162
SST32HF164
SST39SF020P
SST39SF040
SST39SF040P
SST39VF010
SST39VF020
SST39VF020P
SST39VF040P
SST39VF200A
SST39VF400A
SST39VF800A
SST39VF400/Q
SST39VF800/Q
SST39VF160/Q
SST39VF512
SST39VF016/Q
SST49LF002A
SST49LF004A
SST49LV020
SST49LV040
SST49LV080
49LF002
49LF004
49LF008
49LF080A
SST65P542R
89C54
89C58
89E564RD
89V564RD
89E564

89V564
89F54
89F58
89F59
SYNCMOS
F29C51001B
F29C51001T
F29C51002B
F29C51021T

SYNERTEK

SY2716

TEMIC

TSC71RBX2
TSC71RCX2
TSC71RDX2
TSC251G1
TSC251G2
TSC87C51
TS87C5101
TSC87C51RD2
TSC87C52
TSC87251G1A
TS87C51RB2/RC2/RD2
TS87C51U2
T89C51CC01
T89C51RB2
T89C51RC2
T89C51IB2
T89C51IC2
TS89C52X2
TS89C54
TS89C58

T.I.

SMJ2516
SMJ2532
SMJ27C256
SMJ27C512
TMS2516
TMS2532
TMS2532A
TMS27128
TMS2732A
TMS2764
TMS27C010
TMS27C020
TMS27C240
TMS27C010A
TMS27C040
TMS27C128
TMS27C256
TMS27C32
TMS27C512
TMS27C64
TMS27P32A
TMS27P64
TMS27P32A
TMS27P64
TMS27PC010
TMS27PC128
TMS27PC256
TMS27PC32
TMS27P32A
TMS27PC512
TMS27PC64
TMS28C64
TMS27C210
TMS27C210A
TMS27PC210
TMS28F210
TMS28F200ASB(S44)
TMS28F200AST(S44)
TMS28F200AFB(S44)
TMS28F200AFT(S44)
TMS28F200AZB(S44)
TMS28F200AZT(S44)
TMS29LF040
TMX29F010
TMX29F040
EP1810.....P31
EP1830.....P31
EP610
EP910
PAL16L8A
PAL16L8A-2
PAL16R4A
PAL16R4A-2
PAL16R6A

PAL16R6A-2
PAL16R8A
PAL16R8A-2
TIBPAD16N8-7
TIBPAL16L8H-15
TIBPAL16L8-10
TIBPAL16L8-12
TIBPAL16L8-15
TIBPAL16L8-25
TIBPAL16L8-7
TIBPAL16L8-5
TIBPAL16R4H-15
TIBPAL16R4-10
TIBPAL16R4-12
TIBPAL16R4-15
TIBPAL16R4-25
TIBPAL16R4-7
TIBPAL16R4-5
TIBPAL16R6H-15
TIBPAL16R6-10
TIBPAL16R6-12
TIBPAL16R6-15
TIBPAL16R6-25
TIBPAL16R6-7
TIBPAL16R6-5
TIBPAL16R8H-15
TIBPAL16R8-10
TIBPAL16R8-12
TIBPAL16R8-15
TIBPAL16R8-25
TIBPAL16R8-7
TIBPAL16R8-5
TIBPAL20L10
TIBPAL20L8-5
TIBPAL20L8-15
TIBPAL20L8-25
TIBPAL20L8-7
TIBPAL20L8-10
TIBPAL20R4-15
TIBPAL20R4-25
TIBPAL20R4-7
TIBPAL20R4-5
TIBPAL20R4-10
TIBPAL20R6-5
TIBPAL20R6-15
TIBPAL20R6-25
TIBPAL20R6-7
TIBPAL20R6-10
TIBPAL20R8-15
TIBPAL20R8-25
TIBPAL20R8-7
TIBPAL20R8-5
TIBPAL20R8-10
TIBPAL20X10
TIBPAL20X4
TIBPAL20X8
TIBPAL22V10
TIBPAL22V10A
TIBPAL22V10-15
TIBPAL22VP10-20
TIBPAL22VP10-25
TICPAL22V10Z(ZP)
TICPAL22V10Z(TB)
TMS7742
TMS77C82

TOSHIBA

TC541000J
TC541000P
TC541001J
TC541001P
TC54256AF
TC54256AP
TC544000P
TC54512AP
TC54H1024P
TC571000AD
TC571000D
TC571001AD
TC571001D
TC57256
TC57256AD
TC57256ADI
TC57256D
TC574000D
TC574000DI
TC574200D
TC578200D
TC57512AD

TC57H1000AD
TC57H1001AD
TC57H256D
TC58VFB160FT
TC58FVB321FT
TC58FVB400FT
TC58FVT400FT
TC58FTV321FT
TC58FVT641
TC58FVB641
TH50VSF2580A
TH50VSF2581A
TH50VSF3680A
TH50VSF3681A
TMM24128A
TMM24256A
TMM24256B
TMM24512
TMM24512A
TMM2464A
TMM27128
TMM27128A
TMM27128AD
TMM27128ADI
TMM27128D
TMM27128DI
TMM27256
TMM27256A
TMM27256AD
TMM27256ADI
TMM27256BD
TMM27256BDI
TMM27256D
TMM27256DI
TMM2732
TMM27512
TMM27512AD
TMM27512ADI
TMM27512D
TMM27512DI
TMM2764
TMM2764A
TMM2764AD
TMM2764ADI
TMM2764D
TMM2764DI
TC571024D
TC574096D
TC57H1024AD
TC57H1024D
TC57H1025AD
TMP87P241VN
TMP88PS49F

VANTIS

M4-128N/64

VLSI

VT27C256
VT27C512
VT27C64

WHITE MICRO

WE128K8
WE256K8
WE512K8

WINBOND

W27C512
W27CE010
W27E256
W27E257
W27E512
W27F256
W27F512
W27F010
W27E020
W27F040
W27F256
W27E4096
W27E4096(P44) T-44P
W29C011
W29EE010
W29EE011
W29EE021
W29EE512
W29C101
W29C101(44) T-44P
W29C020
W29C040
W49F020

W29F102
W40F002U
W49V002
W49F102
W49L102
W77E58
W78E62
W78E516
W78E516B
W78LE51
W78LE52
W78LE54
W78LE516
W78LE516B
W78LE812

W.S.I

PSD301(P44) T-44P
PSD302(P44) T-44P
PSD311(P44) T-44P
PSD312(P44) T-44P
WS27C010L
WS27C040L
WS27C128F
WS27C256F
WS27C256L
WS57C51C
WS27C512F
WS27C512L
WS27C64F
WS27C64L
WS57C128F
WS57C256F
WS57C512F
WS57C64F
WS27C210L
57C49B
57C49C

XICOR

X20C04
X20C16
X24001
X2402
X2404
X24C00
X24C01
X24C01A
X24C02
X24C04
X24C08
X24C16
X2416
X24128
X24164
X24320
X24645
X25043
X25057
X25097
X25138
X25163
X25165
X25170
X25323
X25325
X25330
X25643
X25644
X24645
X25648
X25650
X25F047
X25F087
X2804A
X2816A
X2816B
X2816C
X28256
X28C256
X2864A
X2864B
X2864H
X28C010
X28C256
X28HC256
X28C512
X28C513
X28LC512
X28LC513

X28C64
XM28C010
X5163
X5165
X5163AG
X5163AG
X5165AH
X5165AH
X68C64
X68257
X76F640
X76F641
X76F100
X84041
X84129
X84161
X84641
X88257
X88064
X88C64
X9315

XILINX

XC1701
XC1701L
XC1718D
XC1718L
XC1736D
XC1736E
XC1736L
XC1765E
XC1765D
XC1765L
XC1765X
XC17128E
XC17128D
XC17128L
XC17128X
XC17256E
XC17256D
XC17256L
XC17256X
XC17512L
XC17C02L
XC17C04L
XC17S05/L
XC17S05XL
XC17S10/L
XC17S10XL
XC17S15
XC17S15A
XC17S30
SC17S30A
XC17S50
XC17S50A
XC17S100
XC17S100A
XC17S150
XC17S150A
XC17S200
XC17S20/L
XC17S20XL
XC17S30/L
XC17S30XL
XC17S40/L
XC17S40XL
XC17S50XL
XC17S100XL
XC17S150XL
XC17S200A
XC17V01
XC17V02
XC17V04
XC17V08
XC17V16
XC18V01
XC18V02
XC18V04
XC18V256
XC18V512
XC7236A (44P)T-44P
XC7272A 68pin ... P10
XC7272A-84pin ... P15
XC7318(44P) T-44P
XC7354(44P) T-44P
XC7336(44P) T-44P
XC7336Q(44P) T-44P
XC7372-68pin P12
XC7372-84pin P16

XC73108 ..... P16
XC9536
XC9536XL
XC9572
XC9572XL
XC95108
XCR3032A
XCR3032D
XCR3032XL

ZILOG

Z86E02
Z86E02(186X/1903)
Z86E03
Z86E06
Z86E04
Z86E04(186X/1903)
Z86E04(1925)
Z86E08
Z86E08(1925)
Z86E21
Z86E30
Z86E31
Z86E33
Z86E34
Z86E40
Z86E43
Z86E44
Z86E61
Z86E63
Z86733
Z86743

RAM(TEST)

DRAM41416
DRAM4164
DRAM41464
DRAM41256
DRAM414256
DRAM41000
SRAM6116
SRAM6164
SRAM61256
SRAM610000

LOGIC IC(TEST)

7400
7401
7402
7403
7404
7405
7406
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7410
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74107
74109
74112
74113
74123
74125
74126
74132

74133 **T-44S:** 44-pin SOP
74136 ADAPTER
74137 **T-48T:** 48-pin TSOP
74138 ADAPTER
74139
74140
74148
74151
74153
74158
74160
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74162
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74165
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74386
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4002
4011
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4501
4503
4506
4512
4518
4519
4532
4572
==========
Universal Adapters
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T-44P: 44-pin PLCC
ADAPTER